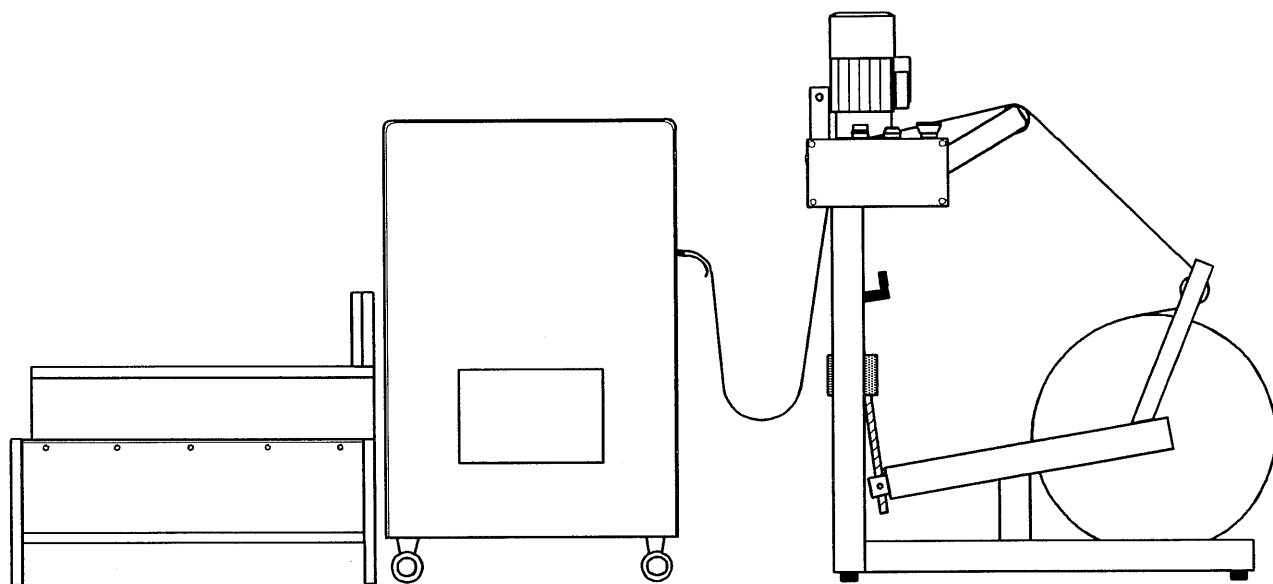


# INSTRUCTION MANUAL



## BRAILLO 400 SR

BRAILLO ● NORWAY  
FOR BETTER BRAILLE - AND MORE



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# 1. INSTALLATION

## 1.1 Requirements of Installation Site

**Space:**

The space requirement for the Braillo 400 SR is approximately 1.5m x 4m (5 x 12 feet).

**Distance to the computer:**

Serial communication: Up to 25 metres (cable distance) from the computer without special transmission precautions.

Parallel communication: Up to 7 metres (cable distance) from the computer without special transmission precautions.

**Environment:**

Braillo Printers are made to operate continuously and reliably for many years. However, sensitive electronic and mechanical parts require a suitable installation environment to ensure long and trouble-free operation.

Failure to meet the installation requirements may relieve the supplier of any warranty responsibilities.

The Printer requires normal office environmental conditions: Temperatures between 15 - 30°C (60 - 86°F), and relative humidity between 40 and 60%.

Maintain a clean environment because dust may clog the Printer - especially with high humidity. Too low humidity should also be avoided to prevent electrostatic problems.

Some paper qualities may generate excessive paper dust. This should be removed with a vacuum cleaner and a damp cloth. (About every 50,000 Sheets.)

Be sure to consult your distributor/supplier for further details concerning the installation site.

## 1.2 Unpacking

Unpacking and installation can be done by the user.

After unpacking the Printer, the cover must be removed before lifting the Printer. See chapter 1.3 "Removal of Cover".

Any kind of lifting of the Printer must always be done from the baseboard at the bottom of the printer, and with extreme care.

Make sure that your Braillo 400 SR has not been damaged in transport. Check if the packing is damaged; If so, it is possible that the Printer has also been damaged or scratched. If any damages are found, please contact your distributor or Braillo Norway immediately.

Also check that the Printer is accompanied with the following items:

- 1 Paper Roll Feeder
- 1 Friction bar and Correction roll.
- 1 Shaft for the paper roll, and Wrench
- 1 Paper Roll
  
- 1 Paper Stacker
- 1 Power cable for the Paper Stacker
  
- 1 Power cable for the Printer
- 2 Data cables (serial and parallel)
- 1 Serial adapter from 9 pins to 25 pins
- 1 Users Manual for the Printer
- 1 Users Manual for the Setup program with a diskette
- 1 Toolkit for service and maintenance
- 1 Test and packing list

If any of these items are missing, please contact your distributor or Braillo Norway A/S.

## Important !

It is very important that the Printer's specified voltage and frequency value corresponds with the local main power supply available.

If the plug on the mains power cable is to be replaced, note that the yellow & green wire is the ground (earth) wire.

Please read this manual carefully before starting the Printer!

## 1.3 Removal of Covers

See figures on the next page.

How to open the Printer:

Open the front and back hatch (B).

Loosen the nut under each corner of the top plate (A) with a 13 mm wrench.

Lift the assembly carefully upwards, and place it aside.

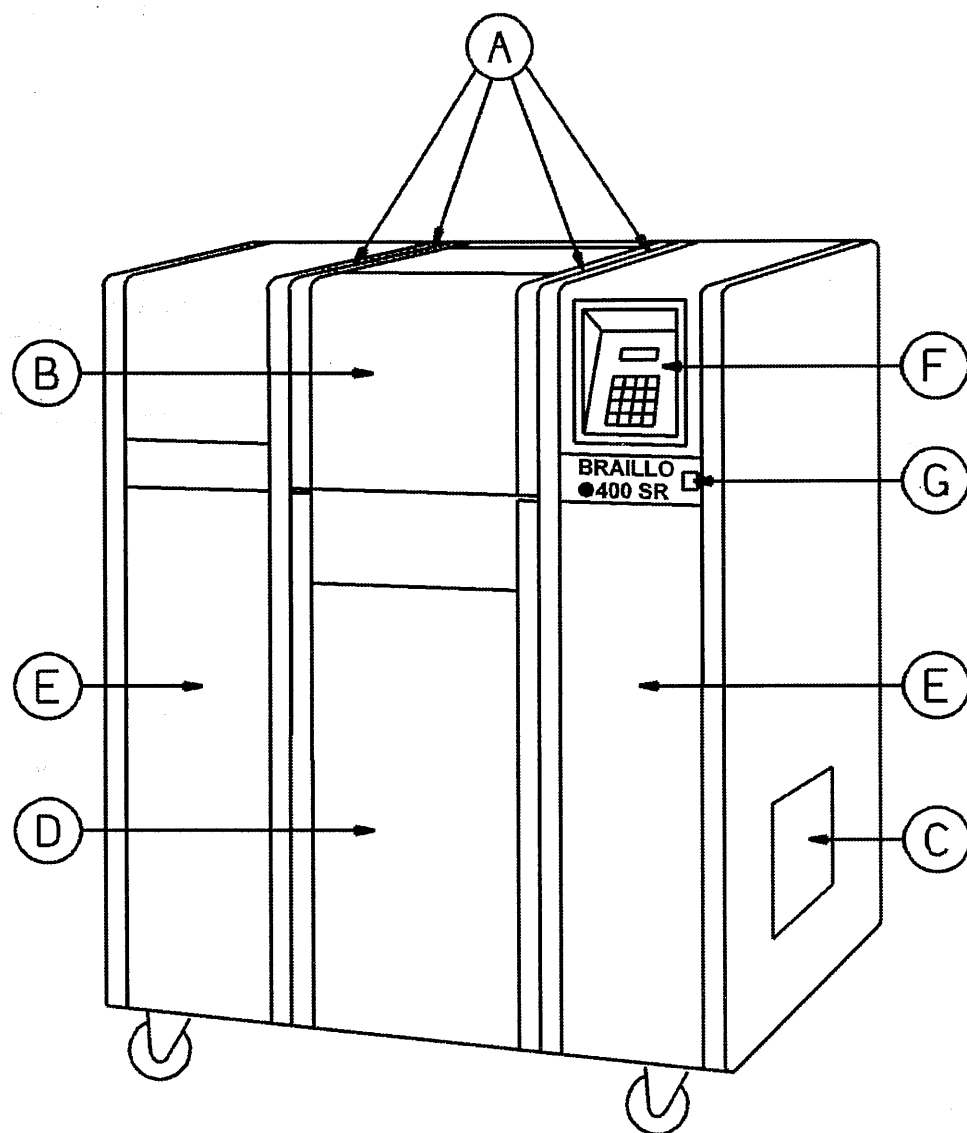
Lift the middle plates (D) on both sides upwards, and at the same time pull out. Place aside.

Slide the two cover sides (E) out from the Printer. Be careful with the cables attached to the covers. Place the covers aside.

The Printer is now open.

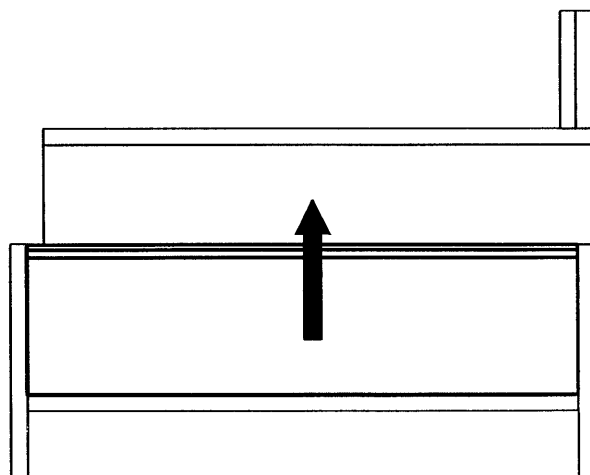
If the cables from the Operating Panel (F) and the Main Switch (G) needs to be disconnected, e.g. for transportation, this is done by the Operating panel on the Operating Panel cable, and by the power unit on the Main Switch cable.

## Removal of Cover, Figures



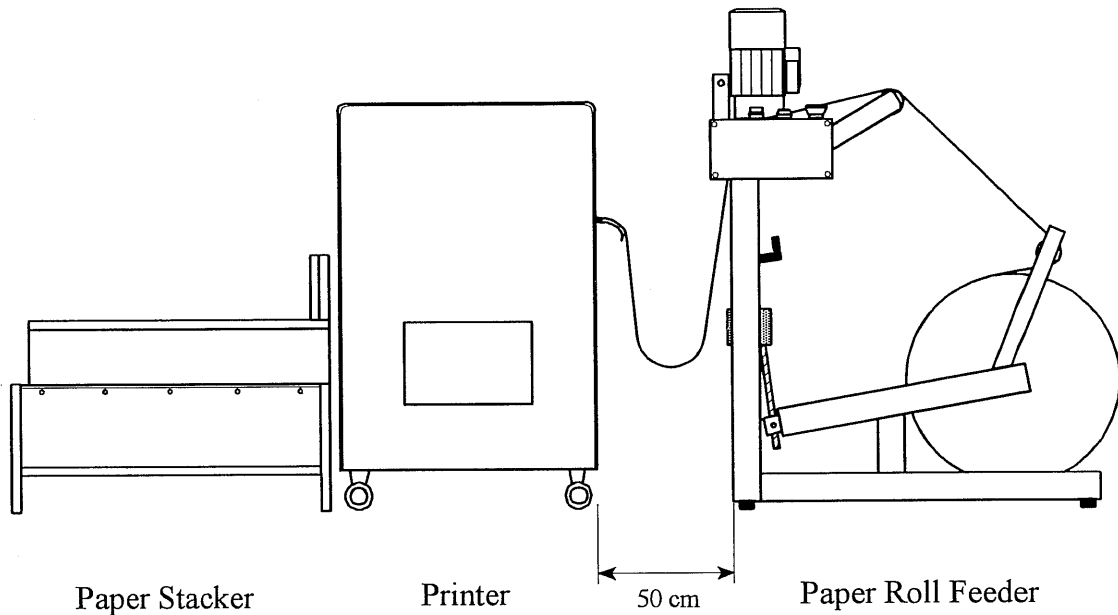
How to open the Paper Stacker:

The cover sides on the Paper Stacker can be removed by lifting upwards. See the figure.



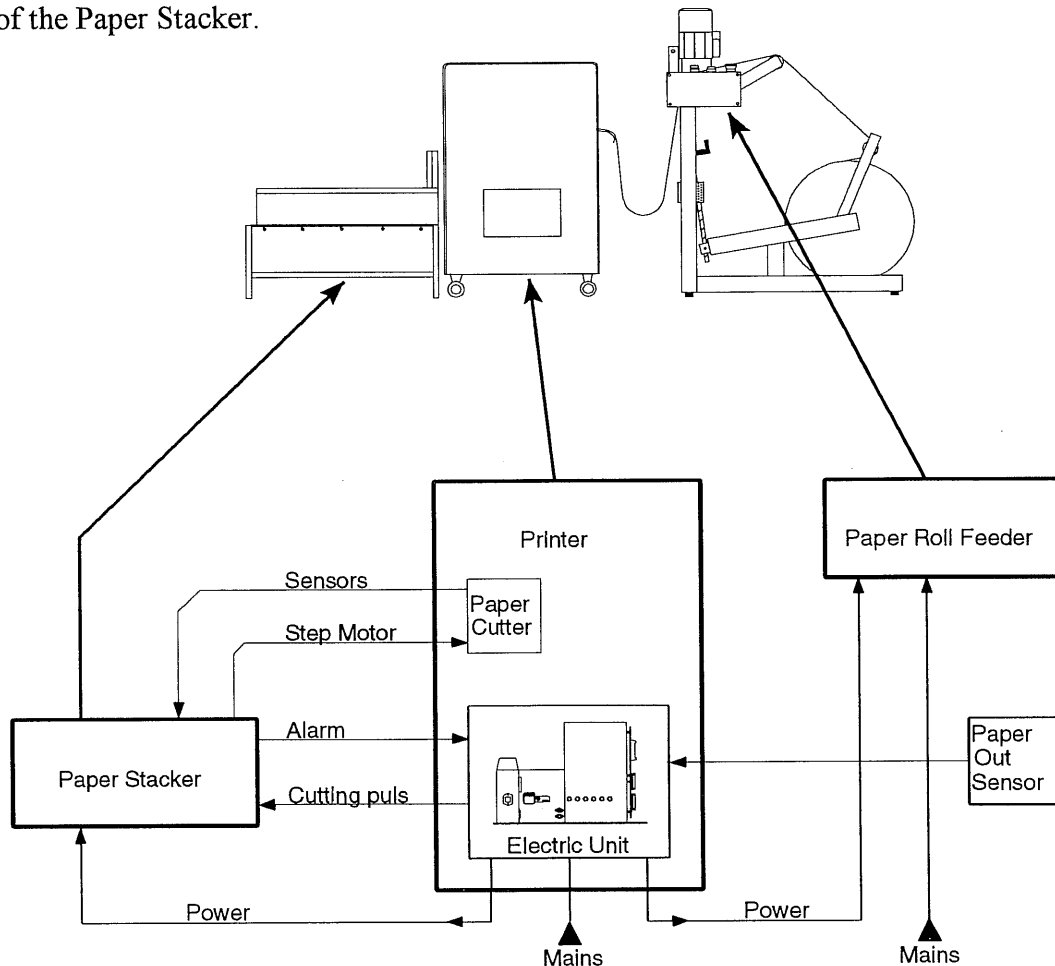
# 1.4 Connecting the Units

The different units should be placed as seen on the figure below.



The Paper Roll Feeder may be considered as an independent unit, even though it is switched on and off with the main switch on the Printer.

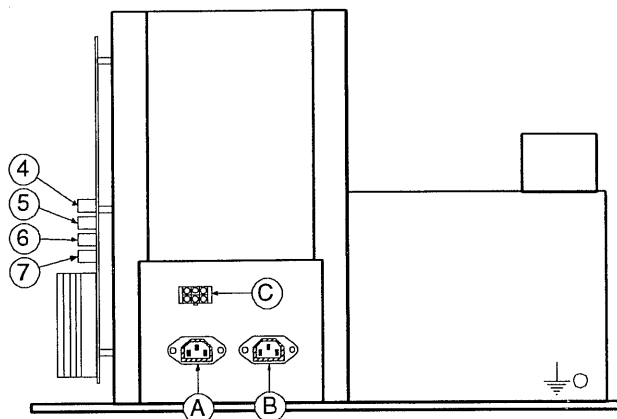
The Paper Stacker on the other hand, is directly attached to the Printer. The paper cutter is physically placed inside the Printer, but it is controlled from the Paper Stacker, and is electrically to be considered as a part of the Paper Stacker.





### Connecting the Paper Roll Feeder to the Printer:

There are three cables coming from the Paper Roll Feeder. One shall be connected directly to the mains, the second to the outlet (A) on the power unit inside the Printer, and the third one is the paper out sensor, and shall be connected to connector (4) on the motherboard in the Printer. The cables to the Printer should be taken through one of the ventilation holes in the baseplate of the Printer. (Do also connect the Paper Roll Feeder to the mains).



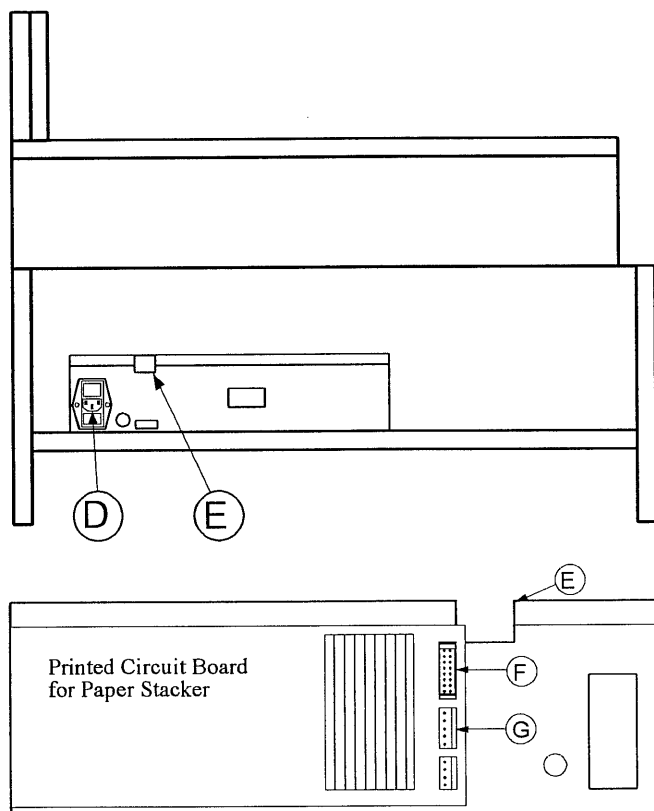
### Connecting the Paper Stacker to the Printer:

See the figure.

There are three cables between the Paper Stacker and the Printer. The power cable shall be connected between the outlet (B) on the power unit inside the Printer, and inlet (D) on the Paper Stacker.

To connect the other two, it is necessary to take the cover on the electric unit inside the Paper Stacker off.

These two cables are going from a connection box which is placed on the Printer frame below the paper cutter, and to the electronic board on the Paper Stacker. These two cables are already connected inside the Printer, and is laying on the baseplate of the Printer. Take the cables from the Printer to the Paper Stacker through one of the ventilation holes in the baseplate. Use the opening (E) in the electronic unit in the Paper Stacker. Go to the opposite side of the Paper Stacker, and connect the cables to connectors (F) and (G) on the circuit board inside the electronic unit.



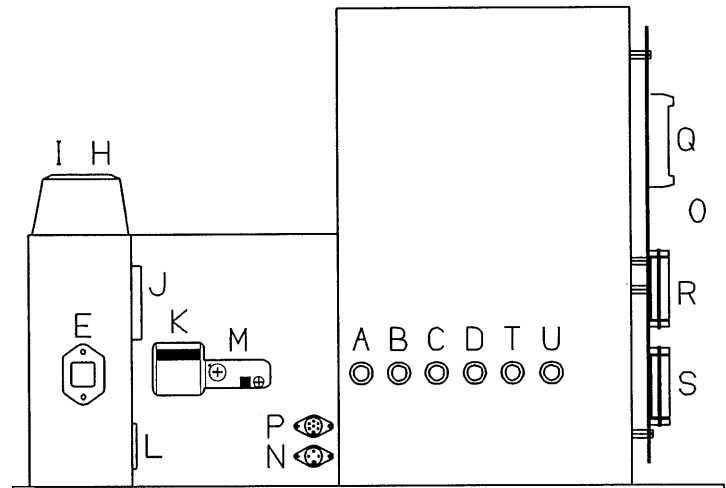
## Connecting the Printer to the Mains and Computer.

See the figure below.

Connect the enclosed mains power cable to the inlet (L). If the plug on the mains power cable is to be replaced, observe that the yellow & green wire is the ground (earth) wire.

If the data communication is going to be parallel, use connector (R). If the data communication is going to be serial, use connector (S).

- A: Fuse, magnet rack A
- B: Fuse, magnet rack B
- C: Fuse, magnet rack C
- D: Fuse, magnet rack D
- E: Connector, main switch
- H: Output, fan
- I: Output, motor
- J: Hour counter
- K: Main fuse
- L: Power inlet
- M: Reset switch, motor fuse
- N: Connector, ext. alarm
- O: Motherboard
- P: Connector, Braillo Cut
- Q: Connector, operating panel
- R: Parallel port
- S: Serial port
- T: Fuse, stepping motor
- U: Fuse, relays



## 1.5 Interfacing to Computer

Data can be transmitted from the computer to the Printer in two ways, either via the serial or the parallel port. Serial transmission goes through an RS 232 C interface. Parallel transmission uses a Centronics compatible interface.

Both connectors are of the 25 pin D-sub types, and are electrically isolated from the computer.

### Parallel communication:

Connect the enclosed cable, ensure that the Printer is set for parallel communication, and start printing.

### Serial communication:

Connect the enclosed cable, ensure that the computer and the Printer have exactly the same transmission settings. If not, they can be changed either on the computer or the Printer. Braillo Norway recommends a baud rate of 9600 Baud for quick and reliable communication.

When the Printer is delivered from Braillo Norway, the serial port has the following transmission settings:

Baud rate:	9600
Parity:	NO
Data bit:	8
Stop bit:	1

To change these settings on the Printer, see chapter 2.1 "Printer Operating Panel". To make changes on your computer, consult the user manual.

If changes in the transmission settings are to be done on the computer, we recommend that these changes are added in the start-up file, AUTOEXEC.BAT, so that they occur automatically with each startup. The command for this might be: MODE COM1:96,N,8,1,P.

The Printer recognizes the following control codes:

CR: New line (fills the rest of the line with space).

LF: New line (fills the rest of the line with space).

If both CR and LF, in any order, immediately follow each other, only one new line command is executed by the Printer.

FF: New page (fills the rest of the page with space).

(After 2 x FF the paper is fed one sheet forward, filling the rest of the page plus the next page with blank space).

If the lines are not terminated with CR or LF, the text which follows will be printed on the same line, until the line length set in the Printer is filled. Remaining characters will be wrapped to the next line. The same situation will occur if FF is missing in the text, the text which follows will appear on the same page, because there is no internal text formatting.

The Printer can also be controlled by ESC-sequences to change its settings and modes. Please see chapter 2.9 "Escape-sequences".

**Note!** If text of less than two pages, or text with an odd number of pages, is received without being followed by FF on the last page, the Printer will wait for more text or FF. This is due to the double-sided operation of the printer. It waits for a signal that its buffer contains a full two page print job before it begins printing.

To have one sheet (two pages) printed, one of the following sequences must be executed:

Double-sided printing:

- A) Two pages full of text.
- B) More than one page of text and one FF.
- C) Less than one page of text and two FF.
- D) Two FF - commands.
- E) Less than one / two pages and depress Dump Buffer.

Single-sided printing:

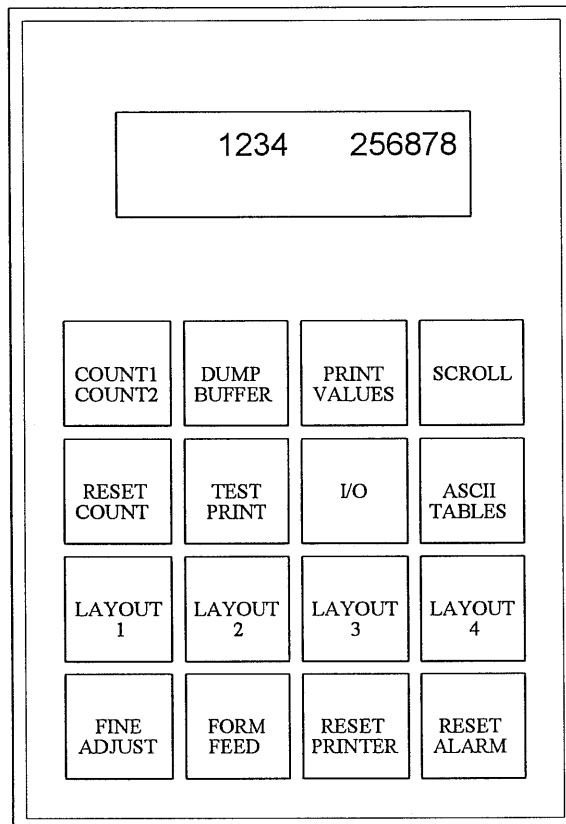
- A) One page full of text.
- B) Less than one page of text and one FF.
- C) Less than one page of text and depress Dump Buffer.

**Note!** When using more than one FF command, have a space between them to keep them separated.  
E.g FF FF FF.

## 2. OPERATING

The main switch on the Printer will also control the Paper Roll Feeder and the Paper Stacker. When switching the Printer on, several things will happen. The Printer and the Paper Stacker will do some reset procedures and positioning the various stepping motors, and the Paper Roll Feeder may start feeding paper, depending on the paper position.

### 2.1 Printer Operating Panel



There is an audio alarm which sounds if a problem has occurred, and the display will show what has happened.

There are three sheet counters. The one at the right-hand side of the display shows the total number of printed sheets and cannot be reset.

The remaining two counters - Count1 and Count2, are displayed one-at-a-time on the left-hand side of the display and can be reset.

## Description of Functions of Printer Operating Panel

### COUNT1 / COUNT2

Selects between sheet counter (not pages!) 1 and 2. When this button is in the outer (released) position, counter 1 is displayed on the left-hand side of the display, and when the button is in (depressed), counter 2 is displayed there.

### DUMP BUFFER

During normal double sided printing, a volume of text of less than two pages will not be printed. This is because the Printer is waiting for a full two page print job. By pushing DUMP BUFFER, the text remaining in the buffer will be printed. See chapter 1.5, "Interfacing to computer".

### PRINT VALUES

Prints the current values of the LAYOUT, I/O and ASCII-TABLES.

See chapter 2.3, "Print Values".

### SCROLL

Scrolls through the menus activated by:

I/O, ASCII-TABLES, LAYOUT 1, LAYOUT 2, LAYOUT 3 or LAYOUT 4 buttons.

### RESET COUNT

Resets the sheet counter selected by COUNT1 / COUNT2.

### TEST PRINT

This button has two functions: Test Print and Ready/Continue.

Test Print:

1st push down:

Prints a X - pattern on both sides of the sheet which shows each pin from each magnet rack printing on a separate line. Useful when searching for missing dots.

2nd push down:

Prints full cells and empty lines, together with the ASCII-table on both sides of the sheet. Useful for testing the printing pressure adjustments, and to see how the paper tolerates tightly grouped dots.

3rd push down:

Prints full cells and empty lines, together with the ASCII-table single sided. Useful for testing the printing pressure adjustments.

4th push down:

Prints a test pattern made of dot 1,3,5 and 2,4,6, single sided. Useful when searching for extra dots.

5th push down:

As 1st push down etc.

Ready/Continue:

When the Printer runs out of paper, or there are some problems with the Paper Stacker or Cutter, the Printer will stop. A message will be shown on the display describing what has happened. To continue printing, correct the problem, then push TEST PRINT in and out.

Do not use RESET PRINTER as this will clear the print job from the printer's memory !

## **I/O - Input/Output**

Selects between serial and parallel port, and sets the data transmission values for the serial port.

1st push down: Displays which port is active.

To select serial or parallel port, the button must be depressed and then released. Now, while the display still shows the active port, press SCROLL to select the other port.

If the serial port is active, a 2nd push down will make it possible to use SCROLL to adjust the settings for the serial port.

## **ASCII-TABLES**

This button has two functions:

It allows one to select which 6 and 8 dot ASCII-table to be active for braille conversion, and it displays the 6 and 8 dot ASCII-tables currently active.

1st push down:

Displays the active ASCII-table, number and country for the 6 dot mode.

2nd push down:

Displays the active ASCII-table, number and country for the 8 dot mode.

Note! This button will not change between the 6 and 8 dot print mode, it just displays which ASCII-tables that will be used in these modes.

To select from the 8 resident ASCII-tables in the Printer, the following procedure should be used:

Push the ASCII-tables button, release it, then push it once again and hold. Now it is possible to change the active ASCII-tables with the SCROLL button. ASCII-table pair number one will be displayed first. (If there has been a pair of ASCII-tables loaded from the computer, these will be displayed first.) If SCROLL is released, and pressed again, ASCII-table pair no. two will be displayed. This continues until pair no. eight is reached, whereafter it will start at pair number one again.

Note! Scrolling through the resident ASCII-tables will clear any user table that has been downloaded from the computer. If this table is to be activated again, it will need to be reloaded from the computer.

## **LAYOUT 1**

Selects sheet length, line length or Single/Double sided printing.

Use SCROLL to choose each setting.

## **LAYOUT 2**

Selects normal or Z-fold printing, if page 1 is to be up or down, and to choose between 6 and 8 dot braille.

Use SCROLL to choose new settings.

## **LAYOUT 3**

Selects the line spacing.

The line spacing is adjustable in steps from 0 to 16. In millimetres this will be from 0 to 5.08 mm. (One step equals 0.3175 mm). The setting 16 is the standard line spacing, 5.08 mm (or 0.2"). 8 is the setting

for graphic, 2.54 mm (or 0.1"), and so on.

The function "Single or Double line spacing" will double the given line spacing. If, e.g. the current line spacing is 13 steps (4.1275 mm), selecting Double line spacing will increase it to 26 steps (8.255 mm). Use SCROLL to choose new settings.

#### **LAYOUT 4**

Selects Page Adjust and Page Margin.

**Note!** Please keep in mind that there is a difference in the terms "page length" and "sheet length". By page length we mean the number of lines of text to be printed on a page, and by sheet length we mean the physical size of a sheet of paper in inches.

The number of lines which can be printed on a page, is dependent on whether 6 or 8 dot braille is used, the selected line spacing, and the page length settings.

The "Page Adjust" can have one of the following values:

**NoFFed:** No formfeed. This setting will cause the printer to print continuously without cutting the paper. There are no pagebreaks, and it is possible to print an infinity long sheet.

**Max:** Maximum. This is the standard setting, and will give a maximum number of lines per page. How many lines that will fit on a page will depend on, e.g. the sheet length, if it's 6 or 8 dot braille, the line spacing, and margins.

**Max-1 to -9:** Maximum, -1 to -9. This setting will decrease the number of lines on each page with 1 to 9, (depending on the selected number). If, e.g. the maximum number of lines would be 29, and the setting "Max-4" is selected, the resulting number of lines will be 25.  
This function will centre the text vertically on the page, to keep the top and bottom margin approx. equal.

The "Page Margin" function will adjust the page margin in steps from 0 to 20. The standard setting is 8, (8 = normal). The page margin will give different effect when used on single-sided, compared with double-sided. On double-sided printing, one step is equal to 0.6350 mm, and the text will be centred vertically on the page. If, e.g. a page margin on 6 steps is selected, the printer will print closer to the edges of the paper, and if a page margin on 20 steps is selected, it will give a larger page margin. This will affect both top and bottom margins, i.e. page margin.

On single-sided printing, however, the page margin will actually work as a top margin. (Note! The page lay out must be set to normal to be able to do the following). One step is equal to 0.6350 mm. It will "push" the text downwards the sheet. When the text reaches the bottom, (meaning that there will not be enough space on this page for the last line), this line will wrap over to the next page.

Use SCROLL to choose new settings.

#### **FINE ADJUST**

Positions the paper.

Each push down moves the paper a distance equal to 0.5".

#### **FORM FEED**

Advances the paper to the next sheet.

**RESET PRINTER**

Resets the CPU unit and clears all buffers.

Must always be used if an error occurs (Printer Error in the display).

**RESET ALARM**

For alarms, the audio alarm can be reset (e.g. Printer Alarm, Out of Paper).

For errors (Printer Error in the display), however, the RESET PRINTER must be used.

**Using the Menu Buttons**

With help of the menu buttons (LAYOUT 1, LAYOUT 2, LAYOUT 3 and LAYOUT 4) the current values can be changed.

The first push of a menu button shows which setting is currently active - its current value.

If this setting is correct, wait a few seconds for the timeout to expire, or press the RESET PRINTER button and the setting will remain.

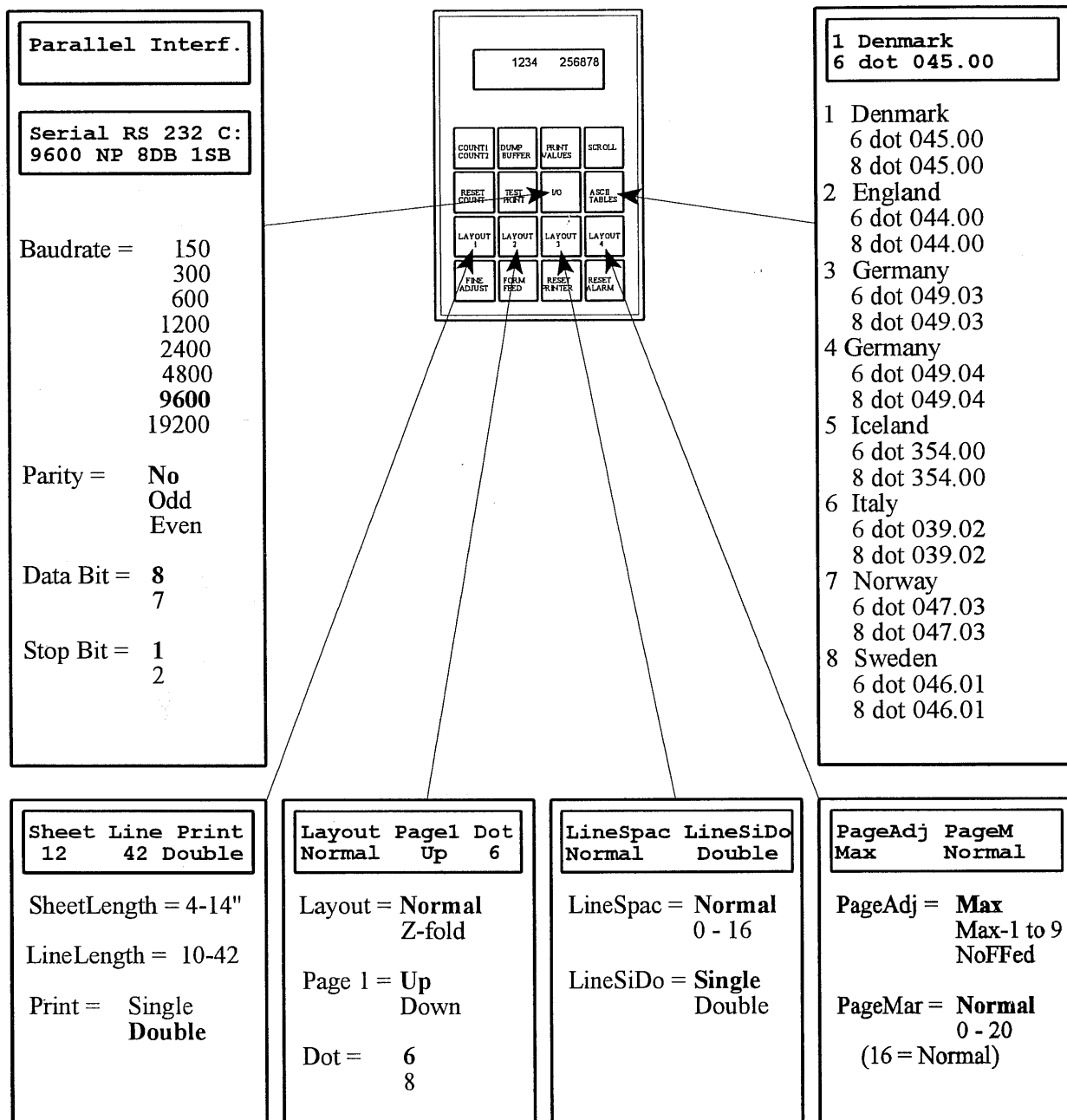
If you would like to change the setting, push the button several times, until the desired function is shown on the display, then hold it down. By using SCROLL, the complete menu for the function can be reviewed in the display. When the correct value is shown, release the button and either wait for the timeout, or use RESET PRINTER.

The I/O and ASCII-table buttons differ slightly from this routine. Please see their button descriptions on the previous page.

Note! The Current Values are saved in the battery-backup memory, and they will remain even if the power is turned off.



## 2.2 Current Values and Options



## 2.3 Print Values

This function gives a printout of the settings which are currently active in the Printer; It also gives information about the 8 ASCII-tables in the Printer.

When Print Values is used, the Line Length setting must be at least 36 characters. If not, this message will appear in the display:

NB! Line Length  
Minimum 36 Char.

To be able to print the current values, change the line length to min. 36 characters.

Print Values might look like this:

```

BRAILLO NORWAY
VERSION 000.18 R
CURRENT VALUES

COMMUNICATION      = SERIAL
BAUD RATE          = 9600
PARITY              = NO
DATA BIT           = 8
STOP BIT           = 1

SHEET LENGTH       = 12
LINE LENGTH        = 42
PRINT              = DOUBLE

LAYOUT              = NORMAL
PAGE 1             = UP
DOT                = 6

LINE SPACING        = NORMAL
LINE SING/DOUB     = SINGLE

PAGE ADJUST        = MAX
PAGE MARGIN        = NORMAL

SHEET COUNTER      1= 87654321

ASCII TABLE
NO 2 =      ENGLAND      6 DOT 044.00
          ENGLAND      8 DOT 044.00

```

"Sheet counter" shows the number of printed sheets. (The same as the counter on the right-hand side on the display). "ASCII table" shows which ASCII-table is active.

The remaining information in the Print Values printout tells which ASCII-tables are available in the EPROM, and might look like the list below.

# BRILLO NORWAY

## ASCII TABLES IN PROM

NO 1 =	DENMARK	6 DOT 045.00
	DENMARK	8 DOT 045.00
NO 2 =	ENGLAND	6 DOT 044.00
	ENGLAND	8 DOT 044.00
NO 3 =	GERMANY	6 DOT 049.03
	GERMANY	8 DOT 049.03
NO 4 =	GERMANY	6 DOT 049.04
	GERMANY	8 DOT 049.04
NO 5 =	ICELAND	6 DOT 354.00
	ICELAND	8 DOT 354.00
NO 6 =	ITALY	6 DOT 036.02
	ITALY	8 DOT 036.02
NO 7 =	NORWAY	6 DOT 047.03
	NORWAY	8 DOT 047.03
NO 8 =	SWEDEN	6 DOT 046.01
	SWEDEN	8 DOT 046.01

All the 8 tables are resident in the Printer. The table which is active is shown under the "ASCII table" section of the printout. To select another table (among the 8), refer to chapter 2.1, "Printer Operating Panel".

Note: This is just an example. The ASCII-tables listed will be dependent upon the combinations which are included in the printer. Some common combinations are listed below:

### EURO 1 931203

1	045.00	Denmark
2	044.00	England
3	049.03	Germany
4	049.04	Germany
5	354.00	Island
6	039.02	Italy
7	047.03	Norway
8	046.01	Sweden

### EURO 2 931203

1	032.00	Belgium
2	044.00	England
3	033.00	France
4	049.03	Germany
5	049.04	Germany
6	039.02	Italy
7	047.03	Norway
8	041.00	Switzerland

### EURO 3 930106

1	043.00	Austria
2	042.00	Czech/Slovakia
3	044.00	England
4	049.03	Germany
5	049.04	Germany
6	030.00	Greece
7	036.00	Hungary
8	047.03	Norway

### AMERICA 931203

1	055.00	Brazil
2	033.01	France
3	049.04	Germany
4	039.02	Italy
5	047.03	Norway
6	351.10	Portugal
7	034.00	Spain
8	001.00	USA

### ASIA1 930118

1	033.01	France
2	049.04	Germany
3	081.00	Japan
4	965.01	Kuwait
5	060.01	Malaysia
6	047.03	Norway
7	966.00	Saudi Arabia
8	001.00	USA

### ASIA2 941025

1	033.01	France
2	049.04	Germany
3	098.00	Iran
4	965.01	Kuwait
5	060.01	Malaysia
6	047.03	Norway
7	966.00	Saudi Arabia
8	001.00	USA

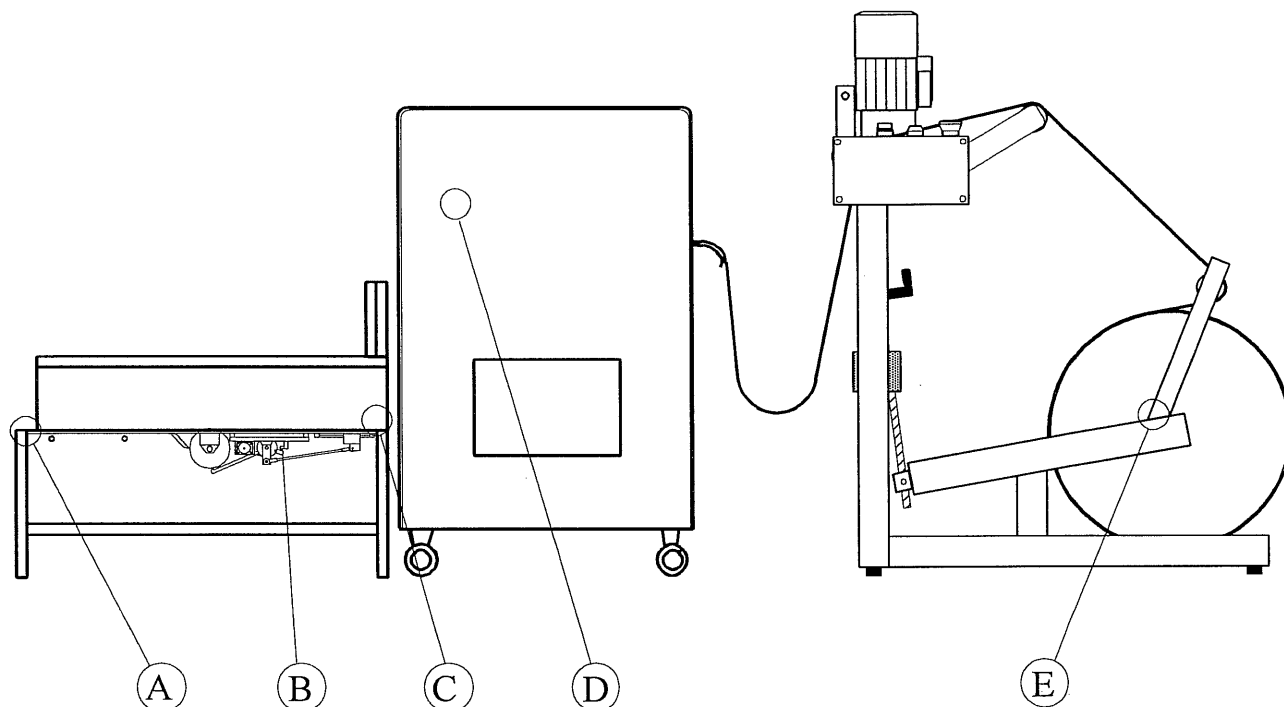
## 2.4 Messages / Error Messages

Messages from the units will appear on the display in the Printer.

The text on the display can be divided into three groups; Messages, Alarms and Error Messages. With messages, the printer operates as normal. With alarms, the Printer can be operated to a certain level. With error messages, the Printer cannot be operated, and RESET PRINTER must be used.

Together with alarms and error messages, an audio alarm will be heard.

Some of the messages are dependent on what happens around the different sensors in the units, and to make the understanding easier, here is an overview of the placing of the sensors:



Sensor:

Function:

- |    |  |
|----|--|
| A. | Detect if the Paper Stacker is full.                       |
| B. | Detect if the Paper Mover is moving correctly.             |
| C. | Detect if the paper has fallen down from the Paper Cutter. |
| D. | Detect if the Paper Cutter is moving correctly.            |
| E. | Detect if the paper roll is empty.                         |

**Messages:**

- |   |   |   |
|---|---|---|
| 1 | <div>Printer<br/>BUFFER empty</div>             | When DUMP BUFFER is used, and the input buffer is empty, the message "BUFFER empty" is shown on the display. The Printer is then ready to begin a new print job. Note: If there is text remaining in the buffer and "Dump Buffer" is not used, the text will appear at the beginning of the next print job. |
| 2 | <div>NB! Line Length<br/>Minimum 36 Char.</div> | When PRINT VALUES is used, and the line length is set to less than 36 characters, this message will appear on the display. To print the current values, first set the line length to 36 characters or more.   |
| 3 | <div>Cut/Stack<br/>Ready</div>                  | This message indicates that there has been a problem in the Paper Cutter or Paper Stacker, and that the problem is now solved, and the printer is ready to continue the print job. To continue, push the TEST PRINT button in and out.  |

**Alarms**

- |   |  |  |
|---|--|--|
| 1 | <div>Printer<br/>Out of Paper</div>            | Activated at sensor (E).<br>When the Paper Roll Feeder runs out of paper, the audio alarm is activated, and the Printer stops at the end of the next page. To continue printing after the paper roll has been replaced, press RESET ALARM and then TEST PRINT. For information, see TEST PRINT READY / CONTINUE, in chapter 2.1 "Printer Operating Panel". |
| 2 | <div>Cut/Stack Alarm<br/>Stacker is Full</div> | Activated at sensor (A).<br>This message indicates that the Paper Stacker is full. The sheets in the Paper Stacker must be removed, and the paper support plate must be pushed to start position. When the message "Cut/Stack Ready" is displayed, the printing can continue by pushing the TEST PRINT button in and out.                                  |

3

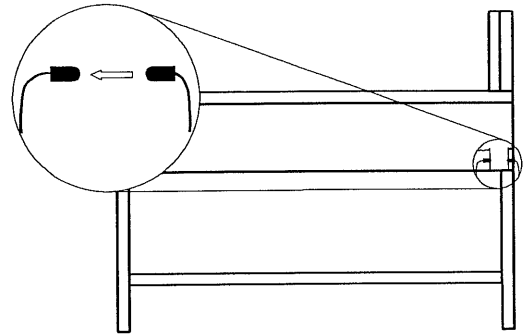
### Cut/Stack Alarm At Paper Sensor

Activated at sensor (C).

See figure to the right. The sensor consists of an infrared light transmitter and a receiver. The arrow is indicating the light beam. When a sheet falls down from the cutter correctly, it will block the light beam, and then moved to the stack. After the cutter in the Printer has cut a sheet, the sheet must be detected by the paper sensor within a certain period of time. If no sheet falls down within this period of time, it will activate the alarm.

However, if the sheet falls down after this, or if somebody "helps" the sheet down, the paper mover will immediately move the sheet to the stack, and the message in the display changes to "Cut/Stack Ready". To continue the printing, push the TEST PRINT button in and out.

If the light beam is blocked at any other time, the alarm will also be activated.



**Note!** Observe that the Paper Mover may start to move when something is detected by the sensor. Use e.g. a piece of paper to block the light beam to avoid hurting your fingers.

The reasons might be:

- A. The paper is stuck in the sliding plates, and does not fall down to the stacker. Loosen the paper so it falls down to the stacker. When the message "Cut/Stack Ready" is displayed, the printing can continue by pushing the TEST PRINT button in and out.
- B. A sheet of paper has been detected when it was not supposed to be there. Remove the sheet. When the message "Cut/Stack Ready" is displayed, the printing can continue by pushing the TEST PRINT button in and out.
- C. The sensor is covered by, e.g. paper or paper dust. Clean the sensor. When the message "Cut/Stack Ready" is displayed, the printing can continue by pushing the TEST PRINT button in and out.

The following alarms are usually caused by a problem with the handshake in the data communication between the computer and the Printer, and it will be necessary to press RESET printer.

The text which remains in the buffer during these alarms can be printed by using DUMP BUFFER.

However, during these alarms one must check the transmission parameters for both the Printer and the computer, and also possibly the software in use. If any changes are made in the Printer, one will have to RESET PRINTER to register these changes.

- |   |  |  |
|---|--|--|
| 4 | <div>Printer<br/>Buffer Overflow</div>       | <p>This alarm indicates that the computer has not registered that the input buffer in the Printer is full, and continues to send data which causes the buffer to overflow.</p> <p>The text which remains in the buffer can be printed by using DUMP BUFFER.</p> <p>If this alarm occurs, check the transmission parameters for both the Printer and the computer, and also possibly the software in use.</p> |
| 5 | <div>Printer Alarm<br/>Overrun/Framing</div> | <p>Error in at least one of the following transmission parameters: Baud rate, no. of data bits and / or no. of stop bits. If this alarm occurs, check the transmission parameters for both the Printer and the computer, and also possibly the software in use.</p>  |
| 6 | <div>Printer Alarm<br/>Parity</div>          | <p>Error in the parity check in serial communication. If this alarm occurs, check the transmission parameters for both the Printer and the computer, and also possibly the software in use.</p>  |
| 7 | <div>Printer Alarm<br/>ESC-Sequences</div>   | <p>Some irregularities have been detected when receiving escape-sequences. If this alarm occurs, check the transmission parameters for both the Printer and the computer, and also possibly the software in use. If the escape-sequences are sent by a batch-file or are integrated in the text-file, be sure that the correct ASCII-value combinations are used.</p>  |

## Error messages caused by the Printer:

On error messages, the Printer cannot be operated, and RESET PRINTER must be used.

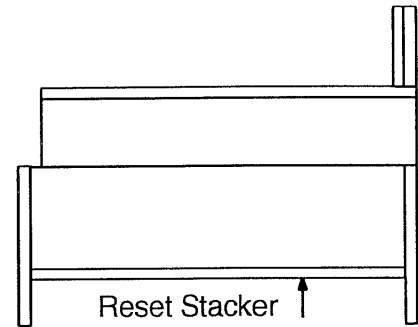
- |   |                                  |  |
|---|----------------------------------|--|
| 1 | Printer Error<br>General Failure | <p>The reason might be:</p> <ul style="list-style-type: none"> <li>A. If the main motor starts, but for some reason stops because of, for example, a blown (released) motor fuse, this message appears in the display, together with the audio alarm. Reset the motor fuse.</li> <li>B. The belt on the Printer breaks during printing. Check the belt, and replace if needed.</li> </ul>      |
| 2 | Printer Error<br>Start Motor     | <p>If the main motor does not start, this error message is shown in the display. The reason might be:</p> <ul style="list-style-type: none"> <li>A. The motor is not connected.<br/>Check that the cable to the motor is connected.</li> <li>B. The motor fuse may have been released.<br/>Reset motor fuse. See figure in chapter 3.19, "Electric Unit".</li> <li>C. System error.</li> </ul> |
| 3 | Printer Error<br>Stop Motor      | <p>The main motor does not stop. The reason might be:</p> <ul style="list-style-type: none"> <li>A. The motor relay contacts have burned.<br/>The relay must be exchanged by service personnel.</li> <li>B. System error.</li> </ul>   |
| 4 | Printer Error<br>Paper Feed      | <p>Disagreement between the paper feed assembly (the paper) and the program system.</p> <p>The reason might be:</p> <ul style="list-style-type: none"> <li>A. The paper is stuck, and the paper feed motor has slipped. Free the paper jam, push RESET PRINTER.</li> <li>B. System error.</li> </ul>   |



## Error messages caused by the Paper Stacker:

On these error messages, the Printer cannot be operated before RESET Stacker is used. Do not use RESET PRINTER.

The RESET Stacker is situated underneath the Paper Stacker. See figure.



1

Cut/Stack Error  
At Paper Mover

Activated at sensor (B).

This indicates that the Paper Mover cannot move to the correct position. See chapter 5.1 "Troubleshooting Paper Stacker". The reason might be:

- A. The paper mover is obstructed by, e.g. paper.
- B. Blown fuse.
- C. The belt on the stepping motor is broken.
- D. System error.

2

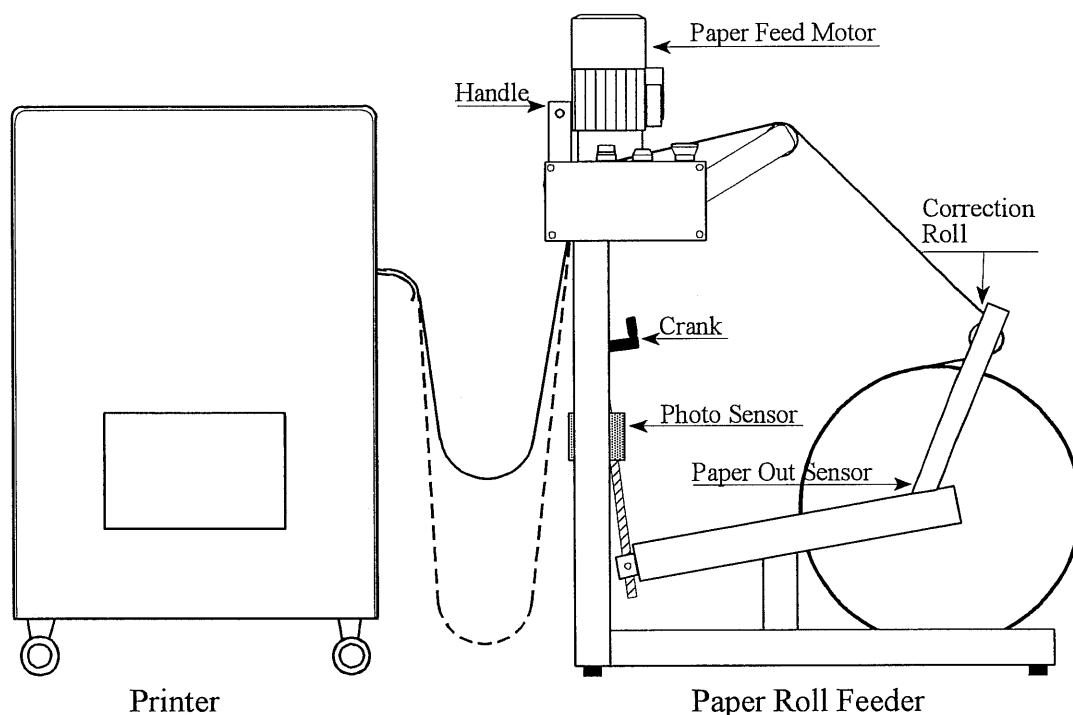
Cut/Stack Error  
At Paper Cutter

Activated at sensors (D).

This indicates that the Paper Cutter carriage cannot move to the correct position. See chapter 5.1 "Troubleshooting Paper Stacker". The reason might be:

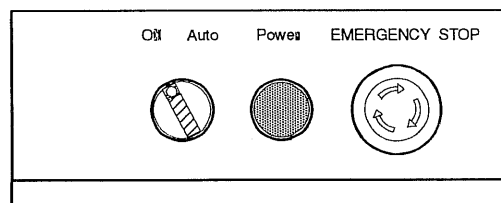
- A. The cutter is obstructed and cannot move.
- B. The fuse is broken.
- C. The belt is broken.
- D. System error.

## 2.5 Paper Roll Feeder



To operate the Paper Roll Feeder, the main switch on the Printer must be in the "on" position.

If the switch marked "Off Auto" is switched to "Auto", the red power lamp will light up, and depending on the paper position, the feeder motor may start. The paper feeding is controlled by a photo sensor and this will always keep a "slack" in the paper between the Paper Roll Feeder and the Printer. The Paper Roll Feeder will automatically feed paper when needed.



**Note!** If any work is to be done near or at the correction rolls, the switch should be switched to "Off". This will disable the photo-sensor, and the feeder motor will not start accidentally.

There is also a safety switch, which operates on the handle for paper insertion on the correction rolls. As soon as the handle moves, the safety switch will turn the whole unit off. And at last, there is an emergency stop. If the emergency stop is activated (pushed down), it has to be reset. The resetting is done by turning the knob (like the arrows illustrate) until the knob "pops up" again.

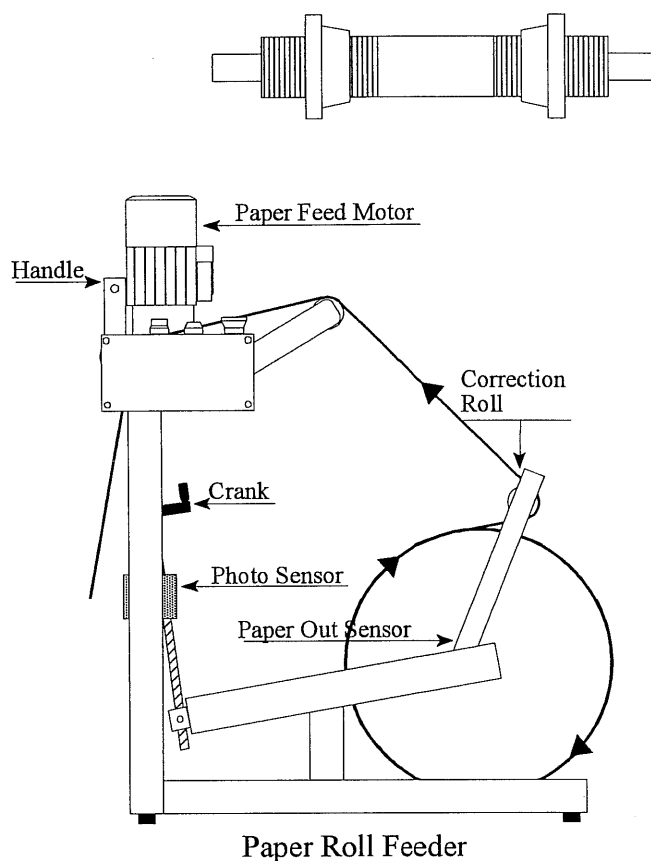
## 2.6 Replacement of the Paper Roll.

### Shaft for Paper Roll.

Put the shaft in the hub on the roll, and ensure that the shaft is approximately in the centre sideways. Fasten the shaft onto the roll with the enclosed wrench. The shape on the shaft is made so that the paper roll will automatically be aligned.

The roll must be placed so that the paper is rolled off at the top. (See figure).

Place the paper roll with the shaft already fastened just behind the Paper Roll Feeder. Use the crank to lower the roll lift until the lift is below the shaft in the roll. Move the roll forward, make sure that the shaft is situated just above the notches, while turning the crank to raise the roll lift. Turn the crank until the roll is lifted above the floor.



The paper line must go in between the friction bars and the correction roll. Ensure that the friction bar is resting on top of the roll.

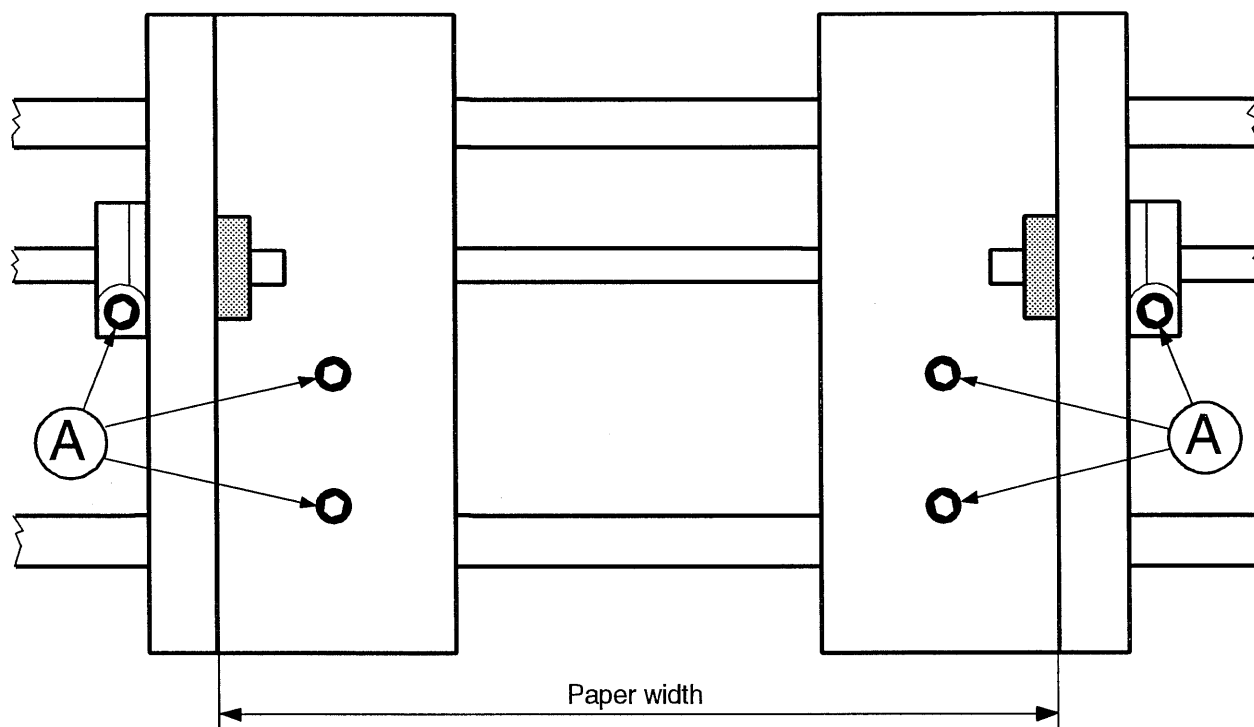
Now the paper must go through the feeder rolls. Use the handle to open the feeder rolls. Insert the paper as shown on the figure above, let some paper hang out from the rolls, and turn the switch "Off Auto" to "Auto". Now the motor will feed some paper, and the paper can be inserted into the printer.

## 2.7 Adjust to Paper Width, Inserting Paper

Tools needed: 3 mm Allen key with T shaped handle  
Philips screwdriver

To adjust the Printer and the Paper Stacker for different paper widths, do as described below:

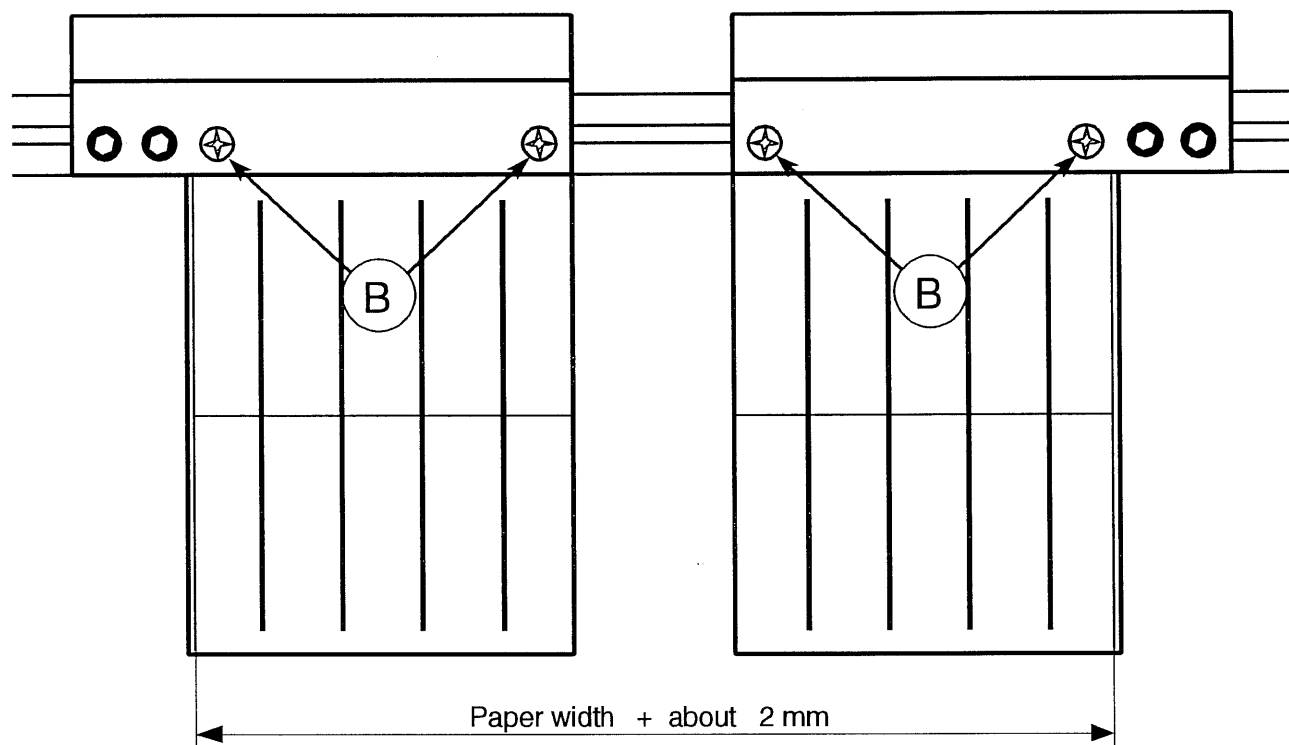
Cut about a sheet of paper off the paper roll. Use this sample to adjust the paper feeder inside the Printer. First, the width of the paper feed assembly needs to be adjusted. (See figure)



Loosen the screws (A) without taking the screws out. The two units can now be moved sideways. Use the paper sample to find the correct position for the two units. The paper sample should fit exactly in between the two units. Fix the units by tightening the screws (A).

Take the paper from the Paper Roll Feeder, loose and move the two plastic knobs on the Printer input paper guide away from each other to the very ends. Insert the paper into the slit in the input paper guide, insert enough so you can reach the paper on the opposite side of the Printer. Go to the output side, move the paper forward until it reaches the paper driving wheels. At the same time, push the Fine Adjust button, and the paper will move forward 0.5" for each push. Repeat this until the paper can be seen under the Paper Cutter's press bar. Do remember to adjust the two plastic knobs on the opposite side of the Printer against the edges on the paper, this to ensure a correct and aligned paper transportation through the Printer.

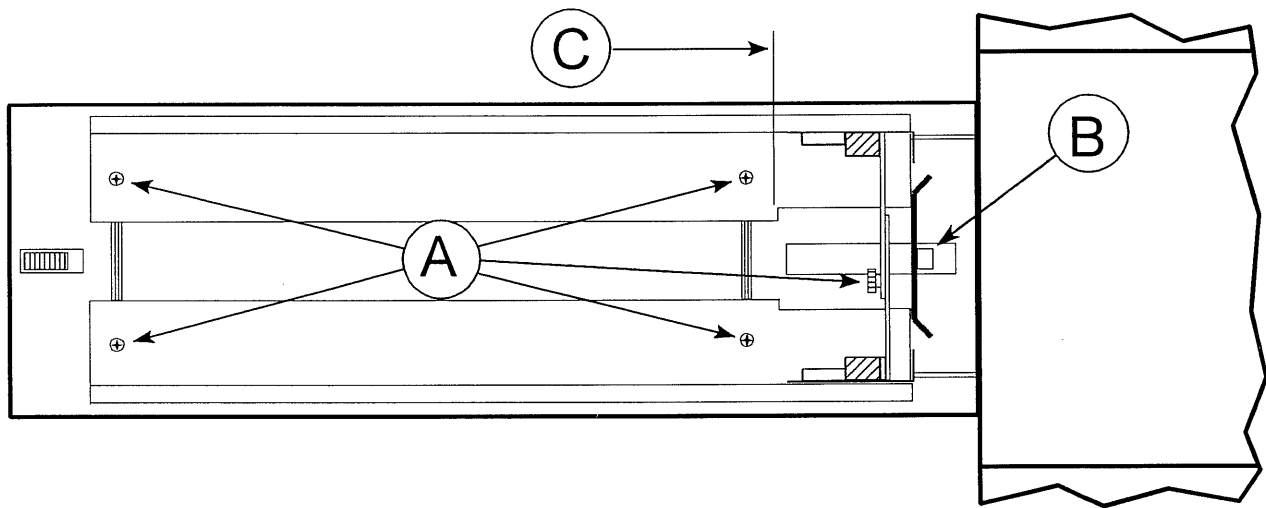
Now the sliding plates must be adjusted to correspond to the paper feed assembly. (See figure below). This is done by loosening the screws (B) so the plates can be moved sideways. Push the Fine Adjust button until the paper can be seen between the sliding plates. Move the plates against the edges on the paper, and make sure there is a little gap on both sides so the paper will slide easily down to the stacker. Remove the paper, and tighten the screws (B).



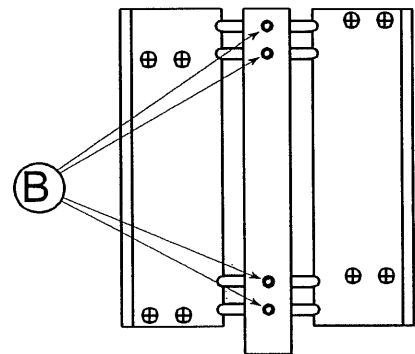
The next thing to do is to adjust the width on the Paper Stacker. The width is determined by the width on the already adjusted sliding plates. The stacker must be adjusted so the sliding plates will be situated on the inside of the stacker. This is to ensure that the paper will not be obstructed on its way down to the stacker.

See figure below, observe that this is top view.

The adjustment is done by loosening the 4 screws, the knob (A), and then move the walls to the desired position.



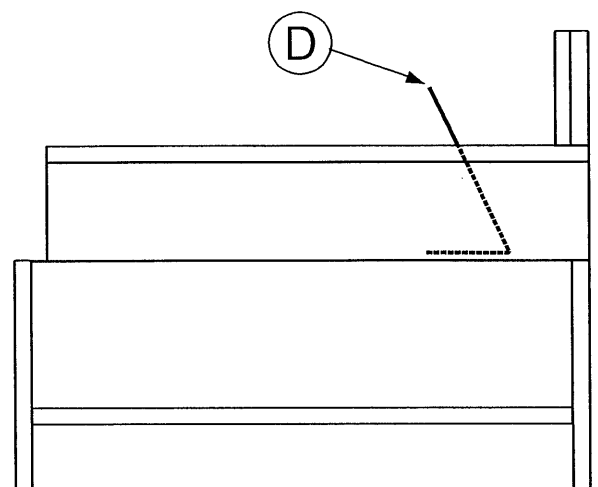
Adjust the pushing plate on the Stacker. This is done by loosening the 4 screws (B), and make the plate as wide as possible without touching the side walls of the stacker.



Pushing Plate on Paper Stacker

Move the paper support (D) to the starting mark (C). The support plate can be pushed towards the Printer, but cannot be moved backwards. If the plate is pushed too far, and should be taken back, it must first be released from the belts, and then moved back.

Push RESET PRINTER, and RESET COUNTER if desired. The Printer is now ready to start printing.



## Tip Stacker

Sometimes when the number of sheets in the Paper Stacker increases, the Paper Mover is not able to move the sheets into the stack. (The sheet tends to fall back into the Mover and disturb the next sheet coming down from the paper cutter). To correct this, the Stacker must be adjusted tighter, and maybe a little tighter at the top than at the bottom.

## 2.8 Test Print

This Braillo Printer has both single-sided, and double-sided (interpoint) test print patterns. (See also TEST PRINT in chapter 2.1 "Printer Operating Panel".)

The test print consists of a X-pattern, some full cell lines, empty cell lines and the complete ASCII-table, and a pattern consisting of a character with dot 1,3,5 combined with a character with dot 2,4,6.

The test print program is designed to ensure that the 168 printing mechanisms functions properly.

It is recommended to print a few pages of test print before beginning the day's production.

How to use the Test Print:

- |                |  |
|----------------|--|
| 1st push down: | Prints a X - pattern on both sides of the sheet which shows each pin from each magnet rack printing on a separate line. Useful when searching for missing dots.                                      |
| 2nd push down: | Prints full cells and empty lines, together with the ASCII-table on both sides of the sheet. Useful for testing the printing pressure adjustments, and to see how the paper can take heavy printing. |
| 3rd push down: | Prints full cells and empty lines, together with the ASCII-table single-sided. Useful for testing the printing pressure adjustments.   |
| 4th push down: | Prints a test pattern made of dot 1,3,5 and 2,4,6, single sided. Useful when searching for extra dots.   |
| 5th push down: | As 1st push down etc.  |

**Note!** To get the single-sided test print to alternate sides, LAYOUT 2 must be used to set the layout to Z-fold.

The chapter 3.2 "Principal Design of Printing Procedure" illustrates how the printing mechanisms are placed. This illustration combined with the printing page sequences, chapter 3.3 "Table of Page Sequences", makes it possible to locate the faulty printing mechanism.

Instruction for troubleshooting will be illustrated by examples in chapter 3.1 "Troubleshooting".

## 2.9 Escape - Sequences

### What is an escape-sequence?

An escape-sequence is just a name for a code which is sent from the computer to the Printer to change the parameters which control the way the Printer works. All parameters that can be set via the operator panel, can also be changed with the help of escape-sequences, (except those for the data communication, i.e. active port, Baud rate, Data bit, Stop bit, and Parity).

This makes it possible to have different codes (read; escape-sequences) stored in a document. For example, when the document is sent to the Printer, these codes are sent automatically first (so that the Printer sets itself in the correct mode and format automatically).

When the Printer receives ASCII 27, it knows that this code and one or more of the following codes are not text, but commands. This makes the Printer stop writing characters, and begins performing the commands.

**Note!** When the Printer receives an escape-sequence, that escape-sequence will have first priority. This means that, regardless of the setting made before and regardless what the operator panel dictates, the most recent escape-sequence will take precedence.

### How to make escape-sequences?

How to make an escape-sequence depends on the computer and the software being used. To make an escape-sequence the ASCII value 27 (hexadecimal 1B) is needed. This is the escape command.

Under MS.DOS 5.0 (or newer) this can be done in the DOS-text editor "Edit". At the dos prompt, type "edit", press Enter, and the editor appears. Now, to create the ASCII value for escape press Ctrl-P, and then press the Escape key. A left arrow will appear on the monitor. This indicate the escape character ASCII 27.

E.g. to make an escape-sequence to set the Printer to 6 dot mode, the command is ESC J0, and in "Edit", It is done as follows; Press Ctrl-P, then press the Escape-key to create the left arrow. Then press J0, and the command is complete. Save the file, exit the editor, and copy this file to the Printer. This will set the Printer to 6 dot mode.

The same thing can be done in Word Perfect 5.1: Press Ctrl-V, then press the Escape-key. The characters will appear on the monitor indicating the escape character ASCII 27. To achieve the same command as in the previous example, press J0. Now this must be saved as a DOS-text file. This is done by pressing Ctrl-F5, then 1 for DOS-text and 1 for Save. Give the file a name, exit WP, and copy the file to the Printer. This will set the Printer to 6 dot mode.

In order to use some of these commands correctly, the ASCII values must sometimes be combined. (For example the number of characters per line and the length of the sheet).

**Note!** Escape-sequences should be placed at the very beginning of the first page on the sheet, (e.g. page 1, 3, 5, 7 osv) except a software formfeed, which can be placed wherever needed. (If there is a command on the other pages, it will be skipped).

All page formatting which is done on the front page will also format the back of the same sheet. It is e.g. not possible to have 8 dot braille on the front page and 6 dot on the back page. It is possible to mix 6 and 8 dot braille however, as long as it is done on two different sheets.



**Overview of the escape-sequences:**

ESC A nn	- Sheet length.	nn can be from 08 to 28 (4 to 14 inch).
ESC B nn	- Line length.	nn can be from 10 to 42 characters.
ESC C n	- Print Format.	n can be 0 or 1, single sided (0) or interpoint (1).
ESC H n	- Page Layout.	n can be 0 or 1, Normal (0) or Z-fold printing (1).
ESC I n	- Page 1 up/down.	n can be 0 or 1, up (0) or down (1).
ESC J n	- 6 / 8 dot braille.	n can be 0 or 1, 6 (0) or 8 (1) dot braille.
ESC M nn	- Line Spacing.	nn can be from 0 to 16 step.
ESC N n	- Line Single/Double.	n can be 0 or 1, single (0) or double line spacing (1).
ESC R n	- Page adjust.	n can be from 0 to 9 lines.
ESC S n	- Form Feed Mode.	n can be 0 or 1, no formfeed (0) or normal formfeed (1).
ESC T nn	- Page margin.	nn can be from 0 to 20 step.
ESC 0	- Soft RESET	
ESC 1	- Soft Form-FEED	
ESC 3	- ASCII-Table from PC	

**Note!** The escape-sequences will be executed immediately if the printer is at stand still. However, if the printer is running, the escape-sequences will keep their place in the document, and will take effect first when that particular page is printed.

Also keep in mind that any page formatting command must be kept on the front page of a sheet. Then the command will affect both the front and back page, i.e. one sheet.

If there are page formatting commands on the back page of a sheet, these commands will be skipped.

Here follows an explanation of how to combine different values to get the different escape-sequences.

**Sheet length:**

ESC A nn - Sheet length. nn can be from 4 to 14 inches.

nn can be a number from 8 to 28, corresponding to the length of the sheet in inches times two. (A 12 inch sheet will have the number 24).

Sheet Length					
Inches	ASCII	HEX	Inches	ASCII	HEX
04.0	027 065 048 056	1B 41 30 38	09.5	027 065 049 057	1B 41 31 39
04.5	027 065 048 057	1B 41 30 39	10.0	027 065 050 048	1B 41 32 30
05.0	027 065 049 048	1B 41 31 30	10.5	027 065 050 049	1B 41 32 31
05.5	027 065 049 049	1B 41 31 31	11.0	027 065 050 050	1B 41 32 32
06.0	027 065 049 050	1B 41 31 32	11.5	027 065 050 051	1B 41 32 33
06.5	027 065 049 051	1B 41 31 33	12.0	027 065 050 052	1B 41 32 34
07.0	027 065 049 052	1B 41 31 34	12.5	027 065 050 053	1B 41 32 35
07.5	027 065 049 053	1B 41 31 35	13.0	027 065 050 054	1B 41 32 36
08.0	027 065 049 054	1B 41 31 36	13.5	027 065 050 055	1B 41 32 37
08.5	027 065 049 055	1B 41 31 37	14.0	027 065 050 056	1B 41 32 38
09.0	027 065 049 056	1B 41 31 38			

Default is 12 inches. Note! The Sheet Length 11.5 inches will correspond to A4.

**Setting the line length:**

ESC B nn - Line length. nn can be from 10 to 42 characters.

Line Length					
Char	ASCII	HEX	Char	ASCII	HEX
10	027 066 049 048	1B 42 31 30	20	027 066 050 048	1B 42 32 30
11	027 066 049 049	1B 42 31 31	21	027 066 050 049	1B 42 32 31
12	027 066 049 050	1B 42 31 32	22	027 066 050 050	1B 42 32 32
13	027 066 049 051	1B 42 31 33	23	027 066 050 051	1B 42 32 33
14	027 066 049 052	1B 42 31 34	24	027 066 050 052	1B 42 32 34
15	027 066 049 053	1B 42 31 35	25	027 066 050 053	1B 42 32 35
16	027 066 049 054	1B 42 31 36	26	027 066 050 054	1B 42 32 36
17	027 066 049 055	1B 42 31 37	27	027 066 050 055	1B 42 32 37
18	027 066 049 056	1B 42 31 38	28	027 066 050 056	1B 42 32 38
19	027 066 049 057	1B 42 31 39	29	027 066 050 057	1B 42 32 39

Line Length					
30	027 066 051 048	1B 42 33 30	37	027 066 051 055	1B 42 33 37
31	027 066 051 049	1B 42 33 31	38	027 066 051 056	1B 42 33 38
32	027 066 051 050	1B 42 33 32	39	027 066 051 057	1B 42 33 39
33	027 066 051 051	1B 42 33 33	40	027 066 052 048	1B 42 34 30
34	027 066 051 052	1B 42 33 34	41	027 066 052 049	1B 42 34 31
35	027 066 051 053	1B 42 33 35	42	027 066 052 050	1B 42 34 32
36	027 066 051 054	1B 42 33 36			

Default is 42 characters pr. line.

**Print Format:**

ESC C n - Print Format. n can be 0 or 1, single sided (0) or interpoint (1).

Print Format		
Print Format	ASCII	HEX
Single-sided	027 067 048	1B 43 30
Double-sided	027 067 049	1B 43 31

Default is Double-sided.

**Page layout:**

ESC H n - Page Layout. n can be 0 or 1, Normal (0) or Z-fold printing (1).

Page Layout		
Page Layout	ASCII	HEX
Normal	027 072 048	1B 48 30
Z-fold	027 072 049	1B 48 31

Default is Normal Page Layout.

**Page 1 up or down:**

ESC I n - Page 1 up/down. n can be 0 or 1, up (0) or down (1).

Page 1 Up or Down		
Page 1 Up or Down	ASCII	HEX
Up	027 073 048	1B 49 30
Down	027 073 049	1B 49 31

Default is Page 1 Up.

**6 / 8 dot braille:**

ESC J n - 6 / 8 dot braille. n can be 0 or 1, 6 (0) or 8 (1) dot braille.

6 / 8 dot braille		
6 / 8 dot braille	ASCII	HEX
6	027 074 048	1B 4A 30
8	027 074 049	1B 4A 31

Default is 6 dot braille.

**Line spacing:**

ESC M nn - Line Spacing. nn can be from 0 to 16 step.

Line Spacing							
Step	mm	ASCII	HEX	Step	mm	ASCII	HEX
0	0	027 077 048 048	1B 4D 30 30	9	2.8575	027 077 048 057	1B 4D 30 39
1	0.3175	027 077 048 049	1B 4D 30 31	10	3.1750	027 077 049 048	1B 4D 31 30
2	0.6350	027 077 048 050	1B 4D 30 32	11	3.4925	027 077 049 049	1B 4D 31 31
3	0.9525	027 077 048 051	1B 4D 30 33	12	3.8100	027 077 049 050	1B 4D 31 32
4	1.2700	027 077 048 052	1B 4D 30 34	13	4.1275	027 077 049 051	1B 4D 31 33
5	1.5875	027 077 048 053	1B 4D 30 35	14	4.4450	027 077 049 052	1B 4D 31 34
6	1.9050	027 077 048 054	1B 4D 30 36	15	4.7625	027 077 049 053	1B 4D 31 35
7	2.2225	027 077 048 055	1B 4D 30 37	16	5.0800	027 077 049 054	1B 4D 31 36
8	2.5400	027 077 048 056	1B 4D 30 38				

Default is 16 steps. 16 steps are the standard line spacing (5.08 mm or 0.2"), 8 is the setting for "graphic" (2.54 mm or 0.1"). Note that if the setting is less than 7, the dots might get damaged in the printing process.

**Single / Double Line Spacing:**

ESC N n - Line Single/Double. N can be 0 or 1, single (0) or double line spacing (1).

Single / Double Line Spacing		
Line Spacing	ASCII	HEX
Single	027 078 048	1B 4E 30
Double	027 078 049	1B 4E 31

Note! The function "Single or Double line spacing" will double the given line spacing. If, e.g. the current line spacing is 13 steps (4.1275 mm), selecting Double line spacing will increase it to 26 steps (8.255 mm).

Default is Single Line Spacing.

**Page Adjust:**

ESC R n - Page adjust. n can be from 0 to 9 lines.

Note! Please keep in mind that there is a difference in the terms “page length” and “sheet length”. By page length we mean the number of lines of text to be printed on a page, and by sheet length we mean the physical size of a sheet of paper in inches.

The number of lines which can be printed on a page, is dependent on whether 6 or 8 dot braille is used, whether what kind of line spacing is in use, and whether page length is set for Maximum, Maximum-1 or upto -9.

Page Adjust					
Omitted Lines	ASCII	HEX	Omitted Lines	ASCII	HEX
0	027 082 048	1B 52 30	5	027 082 053	1B 52 35
1	027 082 049	1B 52 31	6	027 082 054	1B 52 36
2	027 082 050	1B 52 32	7	027 082 055	1B 52 37
3	027 082 051	1B 52 33	8	027 082 056	1B 52 38
4	027 082 052	1B 52 34	9	027 082 057	1B 52 39

Maximum, -1 to -9. This setting will decrease the number of lines on each page with 1 to 9, (depending on the selected number). If, e.g. the maximum number of lines would be 29, and the setting “Max-4” is selected, the resulting number of lines will be 25.

This function will centre the text vertically on the page and keep the top and bottom margin approx. equal.

Default is Maximum number of lines pr. page.

**Form Feed Mode:**

ESC S n - Form Feed Mode. n can be 0 or 1, no formfeed (0) or normal formfeed (1).

FormFeed Mode		
FormFeed Mode	ASCII	HEX
No FormFeed	027 083 048	1B 53 30
Normal FormFeed	027 083 049	1B 53 31

Default is Normal FormFeed.

**Page Margin:**

ESC T nn - Page margin.

nn can be from 0 to 20 step.

Page Margin							
Step	mm	ASCII	HEX	Step	mm	ASCII	HEX
0	0	027 084 048 048	1B 54 30 30	11	6.9850	027 084 049 049	1B 54 31 31
1	0.6350	027 084 048 049	1B 54 30 31	12	7.6200	027 084 049 050	1B 54 31 32
2	1.2700	027 084 048 050	1B 54 30 32	13	8.2550	027 084 049 051	1B 54 31 33
3	1.9050	027 084 048 051	1B 54 30 33	14	8.8900	027 084 049 052	1B 54 31 34
4	2.5400	027 084 048 052	1B 54 30 34	15	9.5250	027 084 049 053	1B 54 31 35
5	3.1750	027 084 048 053	1B 54 30 35	16	10.1600	027 084 049 054	1B 54 31 36
6	3.8100	027 084 048 054	1B 54 30 36	17	10.7950	027 084 049 055	1B 54 31 37
7	4.4450	027 084 048 055	1B 54 30 37	18	11.4300	027 084 049 056	1B 54 31 38
8	5.0800	027 084 048 056	1B 54 30 38	19	12.0650	027 084 049 057	1B 54 31 39
9	5.7150	027 084 048 057	1B 54 30 39	20	12.7000	027 084 050 048	1B 54 32 30
10	6.3500	027 084 049 048	1B 54 31 30				

The "Page Margin" function will adjust the page margin in steps from 0 to 20. The standard setting is 8, (8 = normal). The page margin will give different effect when used on single-sided, compared with double-sided. On double-sided printing, one step is equal to 0.6350 mm, and the text will be centred vertically on the page. If, e.g. a page margin on 6 steps is selected, the printer will print closer to the edges of the paper, and if a page margin on 20 steps is selected, it will give a larger page margin. This will affect both top and bottom margins, i.e. page margin.

On single-sided printing, however, the page margin will actually work as a top margin. (Note! The page lay out must be set to normal). One step is equal to 0.6350 mm. It will "push" the text downwards the sheet. If the text reaches the bottom, (meaning that there will not be enough space on this page for the last line), this line will wrap over to the next page.

Default is 8 steps.

**Software Reset:**

ESC 0 - Soft Reset

Note! This command is used to reset the Printer. It is used from the computer and has the same effect as pushing the key RESET PRINTER. Software Reset should be used with care. If the printer has not finished printing, the rest of the text in the buffers will be lost, and a new paper position will be assumed by the Printer. Because of this, the command is only to be used after a software formfeed has been executed, and the Printer has stopped completely.

Software Reset		
	ASCII	HEX
Software Reset	027 048	1B 30

Software Form Feed:

ESC 1            - Soft Form-Feed

Note! This command is to be used after all text in one volume has been transmitted to the Printer. If text corresponding to less than two pages, or text with an odd number of pages is received, and not followed by FF on the last page, the Printer will wait for more text or FF. This means that the last page may be stuck in the Printer. This is due to the double-sided printing of the Printer. This command makes the Printer to start printing the rest of the text. After this the paper position will be the same as it had when this volume of text was started. Then page no. 1 on the next volume will start out correctly. There will always be at least one blank sheet of paper between the volumes of text when finishing each volume with a Software Form Feed.

Software FormFeed		
	ASCII	HEX
Software FormFeed	027 049	1B 31

2.10   Lines per Page, Example:

Lines per Page, Example.				
Sheet Length, Inches	Normal LineSpac 6 dot	Normal LineSpac 8 dot	Double LineSpac 6 dot	Double LineSpac 8 dot
4	9	7	6	5
5	11	9	7	6
6	14	11	9	8
7	16	13	11	9
8	19	15	12	11
9	21	17	14	12
10	24	19	16	13
11	26	21	17	15
12	29	23	19	16
13	31	25	21	18
14	34	27	22	19

### 3. SERVICE AND MAINTENANCE PRINTER

#### 3.1 Troubleshooting

Through proofreading, errors have been found in some of the characters in the text.

The first thing to do is:

Check the characters in the text-file in your computer to find out if the error could come from the text-file and not from the Braillo Printer. However, if your text-file is OK, some problem has occurred in the Braillo Printer.

Inside the Printer there are four identical magnet racks, named from A to D. Each magnet rack contents 42 printing mechanisms. There are totally 168 different printing mechanisms to choose among when the error search begins. See figure in chapter 3.2, "Principal Design of Printing Procedure".

As a start, you should run the built-in Test Print. Depending on what kind of errors you have, you should use different tests.

The essential thing at this stage is to find which magnet rack is causing the trouble.

If there is missing dot(s), use the X-pattern to detect which magnet rack(s) is missing the dot(s).

If there are too many dots, use the full cell lines, or the test pattern on test print no. 4, and the extra dots will appear in the space between the lines.

However, the best test is ordinary text, if a proofreader is available. To locate the faulty magnet rack, use the Table of Page Sequences.

See figure in chapter 3.3, "Table of Page Sequences".

**Note! The table is made for Page 1 up.**

An example how to use the table:

- 1 Find the page with the error. (Use the pagination on the printed page). Let us assume that the error has occurred on page 10. Find the braille cell with the error. The braille cell contains 2 columns of each 3 (or 4) dots. See figure below.  
Here, it is assumed that the error is found in the column with dot 1, 2, 3 (and 7).
- 2 The Table of Page Sequences shows that page 10 is printed from the top and downwards. From the same table you can see that this column with dot 1, 2, 3 (and 7) in the braille cell is printed by a mechanism in magnet rack A.

Braille cell

1	○	○	4
2	○	○	5
3	○	○	6
7	○	○	8



### Possible reasons for errors

See figures on page 44.

If a dot from a certain printing pin is missing regularly, the reason might be one of the following:

- 1 - Defect magnet (7).
- 2 - Broken short pivot arm (9).
- 3 - The long pivot arm (3) cannot move because of dirt.
- 4 - The printing pin is stuck because of dirt, causing the short pivot arm (9) to miss the long pivot arm (3).
- 5 - Errors on the Magnet Rack Driver Board.

If dots from several printing pins are missing now and then, the reason might be one of the following:

- 1 - The sponge list (5) is pushing too hard on the long pivot arm (3).
- 2 - The gap (11) is too large.
- 3 - The support list (1) has become sticky on the side against the long pivot arms (3), and the long pivot arm does not move properly.

If there are too many dots on the paper, the reason might be one of the following:

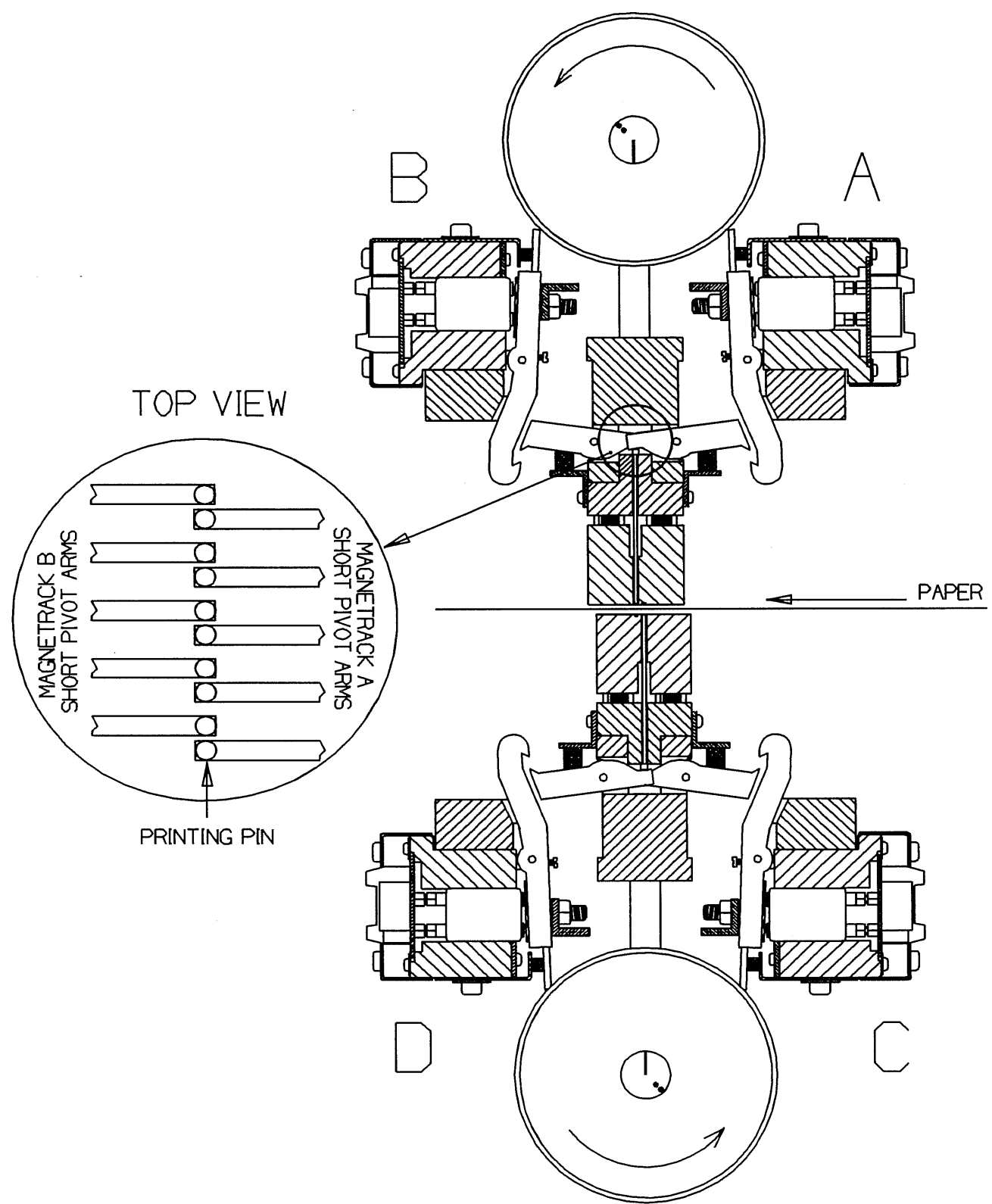
- 1 - The sponge list (5) is not pressing enough on the long pivot arm (3).
- 2 - The gap (11) is too small.
- 3 - The magnet poles have become sticky, and this causes the pivot arms (3) to stick to the magnet.
- 4 - The long pivot arm (3) does not move properly.

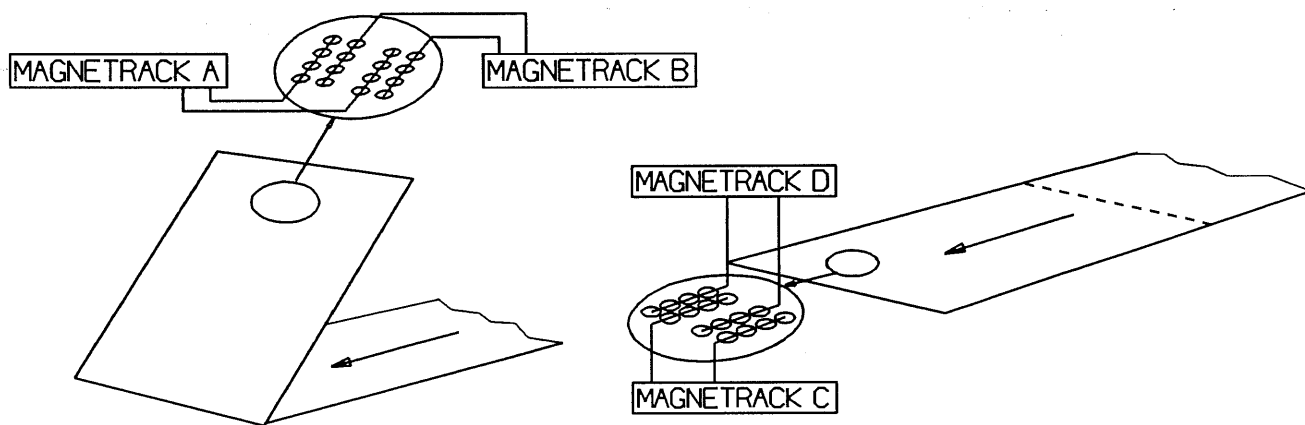
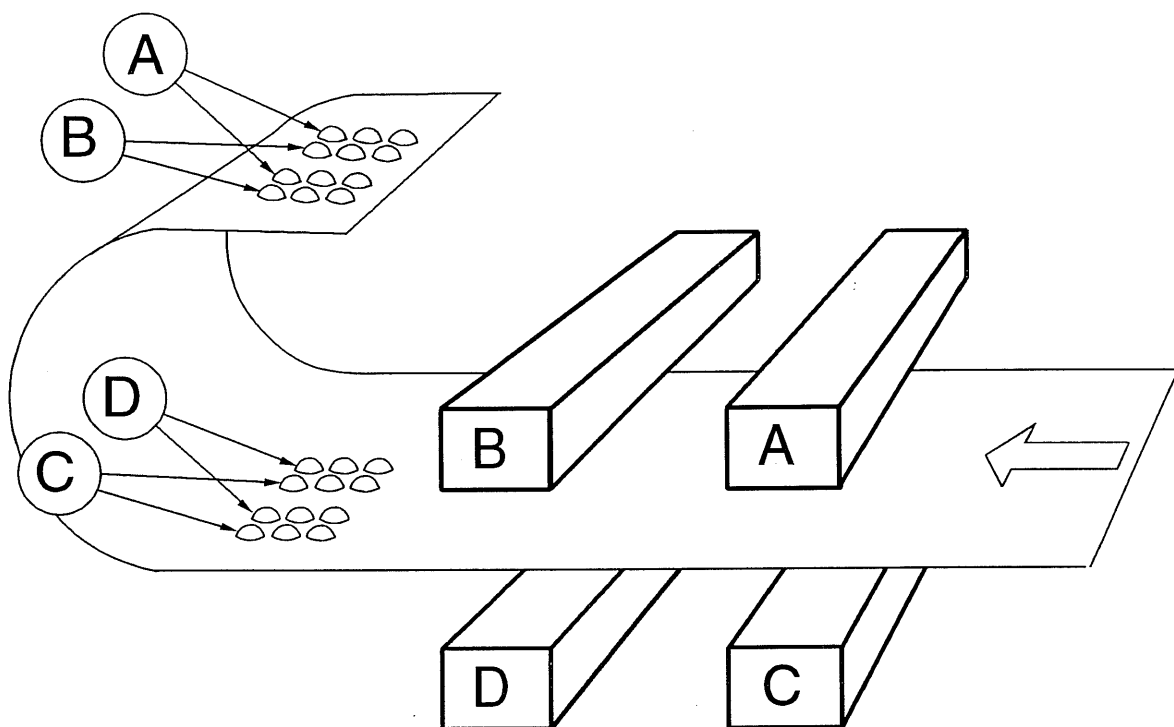
### Control:

To ensure yourself that you have found the right mechanism after a search, you can do the following test: Pull the suspected long pivot arm against the magnet with your finger. (Like the lowest figure on page 45).

At the same time, run a test print. The mechanism with the finger on, will make a column of dots downwards the paper until you take the finger away. By doing this you can see if this column of dots is situated on the same place on the sheet as the error is.

3.2 Principal Design of Printing Procedure





Observe that the same printing mechanism (magnet, long pivot arm, short pivot arm and printing pin) makes all the dots in a column downwards the page.

3.3 Table of Page Sequences

Page layout:

Note! The table is made for Page 1 up.

Normal:

Page:	2-4-6-8-10-12-14-16-18-20-22-24-26-28-30	Dot	1-2-3-7	Magnet	Rack A
	32-34-36-38-40-42-44-46-48-50-52-54-56	Dot	4-5-6-8	Magnet	Rack B
	<div><div>13</div><div>24</div><div>35</div><div>46</div><div>57</div><div>68</div></div>				

Page:	1-3-5-7-9-11-13-15-17-19-21-23-25-27-29	Dot	1-2-3-7	Magnet	Rack C
	31-33-35-37-39-41-43-45-47-49-51-53-55	Dot	4-5-6-8	Magnet	Rack D

Z-fold

Page:	1-5-9-13-17-21-25-29-33-37-41-45-49-53	Dot	1-2-3-7	Magnet	Rack C
	57-61-65-69-73-77-81-85-89-93-97-101	Dot	4-5-6-8	Magnet	Rack D

Page:	4-8-12-16-20-24-28-32-36-40-44-48-52-56	Dot	1-2-3-7	Magnet	Rack D
	60-64-68-72-76-80-84-88-92-96-100-104	Dot	4-5-6-8	Magnet	Rack C
	<div><div>15</div><div>26</div><div>37</div><div>48</div><div>59</div><div>70</div></div>				

Page:	2-6-10-14-18-22-26-30-34-38-42-46-50	Dot	1-2-3-7	Magnet	Rack A
	54-58-62-66-70-74-78-82-86-90-94-98-102	Dot	4-5-6-8	Magnet	Rack B

Page:	3-7-11-15-19-23-27-31-35-39-43-47-51-55	Dot	1-2-3-7	Magnet	Rack B
	59-63-67-71-75-79-83-87-91-95-99-103	Dot	4-5-6-8	Magnet	Rack A

Braille cell

1	○	○	4
2	○	○	5
3	○	○	6
7	○	○	8

### 3.4 Magnet Rack, Removal and Refitting

See figures on page 43 and 44.

To remove the magnet rack, unscrew two pairs of screws (13), lift out the assembly.

Refitting is the reverse of removal, but observe:

The Printer is adjusted for optimal point quality when delivered, but different paper quality could make it necessary to make some adjustments. Our service personnel will adjust the Printer when they are on site. However, if the Printer should need adjustment and Braillo Norway service personnel is not available, it should be done like this:

Turn the belt, so the marking at the end of the shafts is pointing in the opposite direction of each other (see figure below), and lock the shaft, e.g. with a locking wrench in this position.

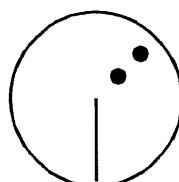
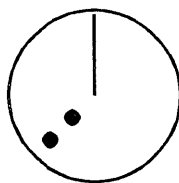
The already adjusted magnet rack assembly is fastened on the Printer. The gap (11) should be about 0.2 mm, and may be adjusted using screw (16). Make sure that the gap (11) is the same at both ends of the magnet rack.

The distance (10) should be about 1.0 mm, but if the braille dots are too weak, you may adjust the magnet rack tighter in small steps (increase the distance (10)). This is done by loosening the screws (12), and use the two nuts (17) on the outside of pillar (14) to move the magnet rack up or down. Do this at both ends of the magnet rack.

Test the Printer for each step of 1/4 rev. of the nuts (17). This will move the magnet rack about 0.3 mm up or down..

**Note! Do not adjust too tight, the pivot arms may be overstrained and break.**

The magnet rack assembly may be moved sideways using two eccentric adjusters at the ends. This is done at the factory, and should never need to be changed.



### 3.5 Magnet Rack, Disassembly, Assembly and Adjusting

See figures on page 44.

Remove the magnet rack as described on page 41.

This is what to do if a magnet (7) is to be replaced, or a complete cleaning is to be done.

Remove the support list (1) and the sponge list (5). Remove the two screws which were hidden under the sponge list (5). This will make the guide list for the long pivot arm come loose. This, with all the pivot arms, should be placed aside.

To replace a magnet (7), unscrew the five screws holding the locking list (6), remove the locking list (6), and pull out the magnet (7) with a narrow pair of pliers.

The magnet can be measured with a multimeter, and the internal resistance should be between 185 and 220 ohm, if the magnet is O.K.

When inserting a new magnet, the magnet should be inserted exactly the same way as the rest of the magnets. (Observe the small spikes which come out of the soldering on the magnets). If two magnets are placed with this spikes against each other, the Printer will probably make two dots instead of one when one of these magnets is engaged. Also make sure that the connectors on the new magnet are placed exactly in the connectors in the printed circuit board.

The assembly is done in reverse order.

Mount the guide list (8) with the pivot arms on the magnet rack.

Observe the following:

The support list (1) must be adjusted and fastened so the gap between the support list and the long pivot arms (3) is 0.8 mm, when the long pivot arm is against the magnet. Use a feeler gauge to check this adjustment.

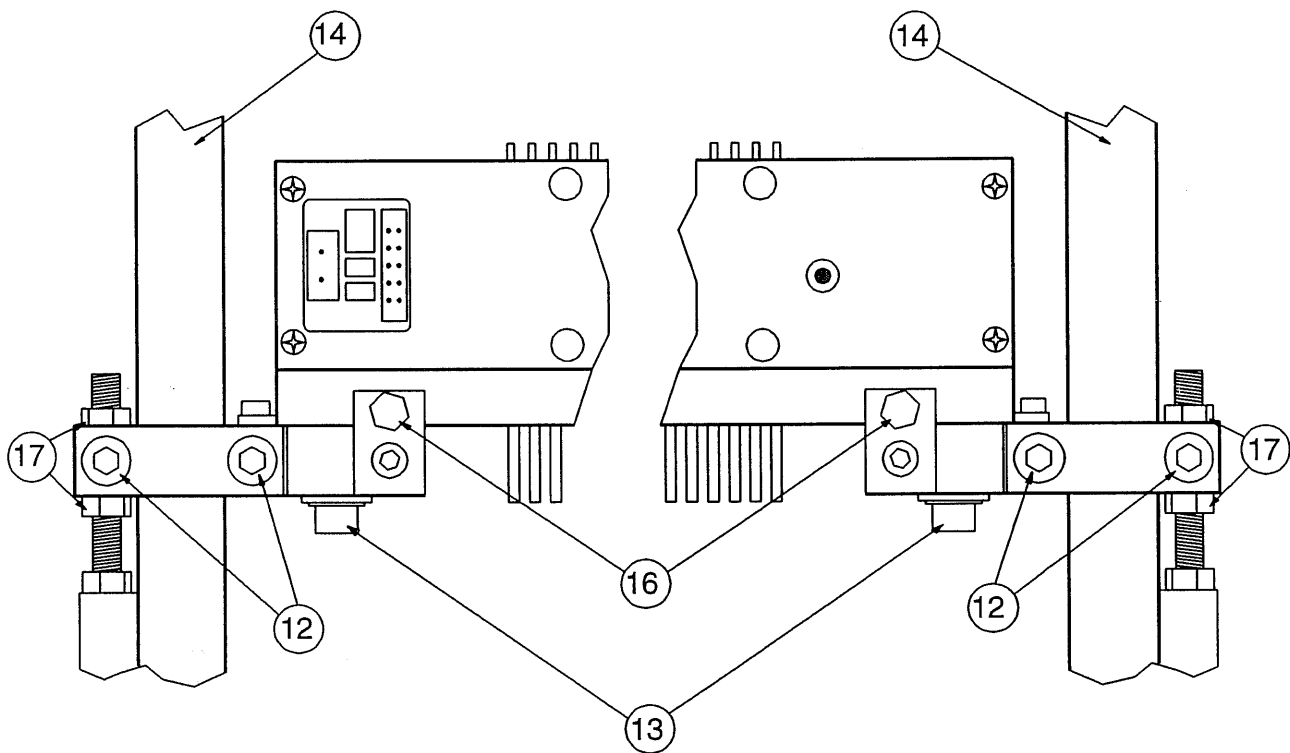
The sponge list (5) must be adjusted and fastened so the sponges (4) barely touches the top of the long pivot arms (3) when the magnets are released.

#### **How to replace a long pivot arm:**

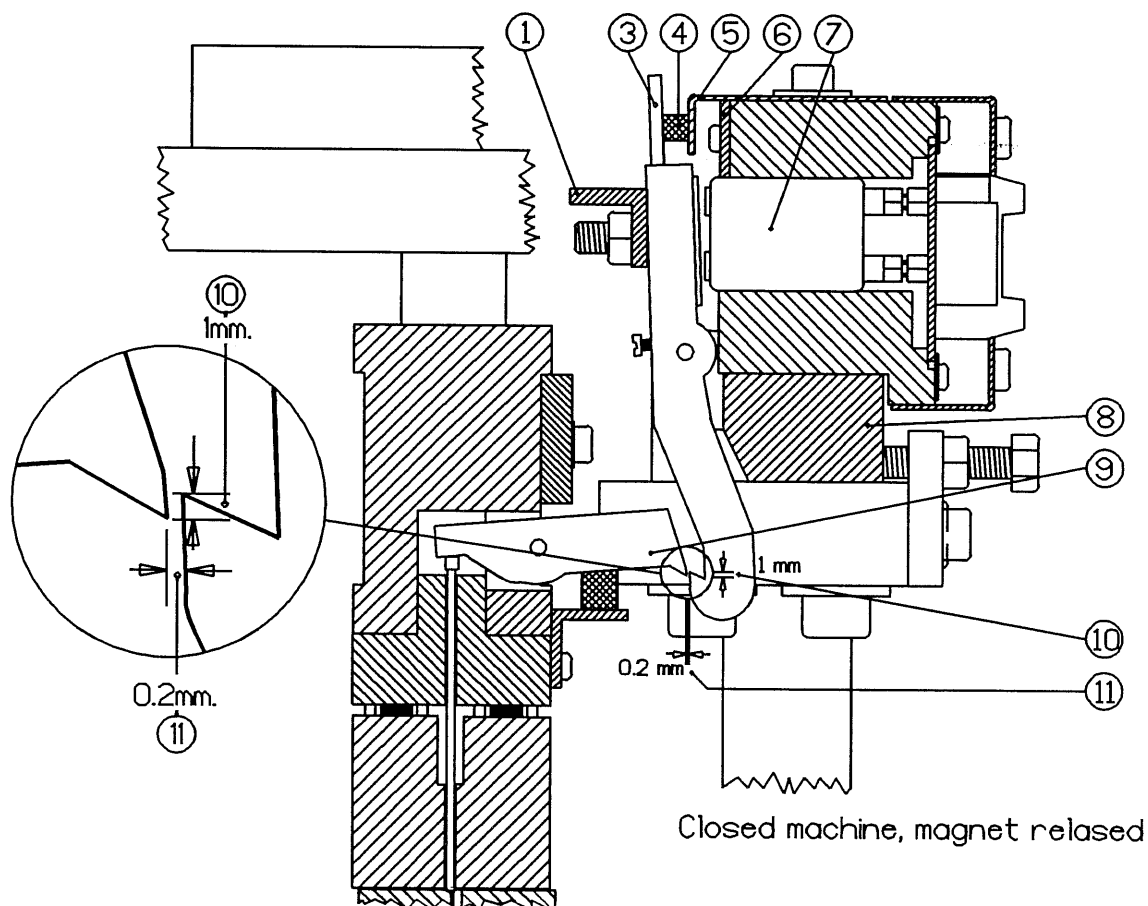
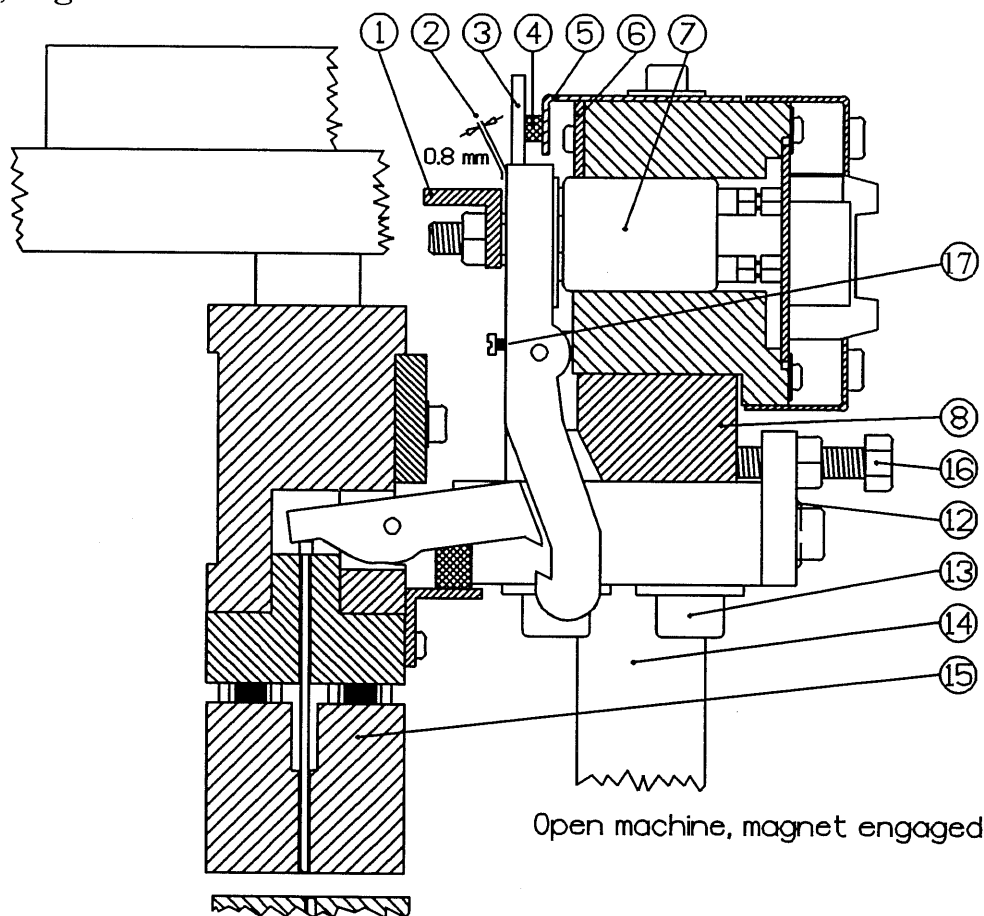
Remove the magnet rack as described on page 41. Remove the support list (1) and the sponge list (5). Now, loosen the screws (17). Note! Do not try to unscrew the screws (17) completely. They should only be loosened about one revolution. Use, e.g. a small screwdriver to slide the pivot arm shaft sideways until the defect pivot arm is loose. Take it out and replace it with a new one. Put the pivot arm in the position so that you can slide the shaft back in place. Repeat this for each loose pivot arm until the shaft is approx. in the centre on the magnet rack. When tightening the small screws (17), pull at the same time the pivot arm shaft into its slot. And do not over tighten, these screws are fragile!

Assemble the magnet rack as described above.

3.6 Magnet Rack, Figures

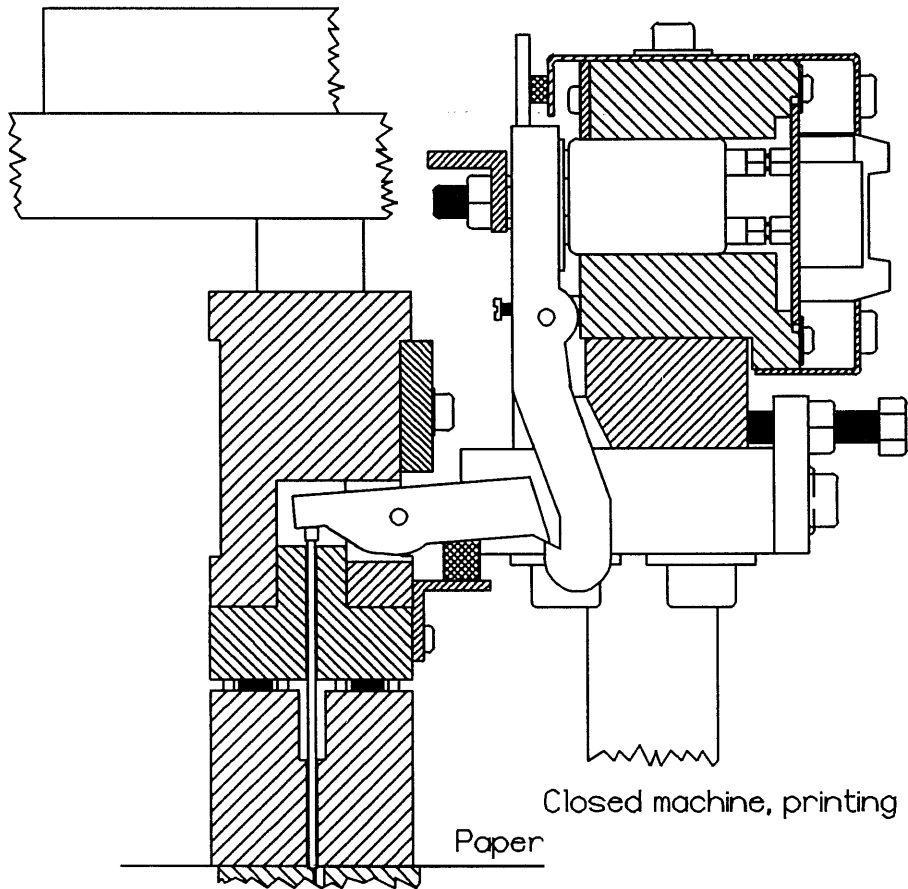
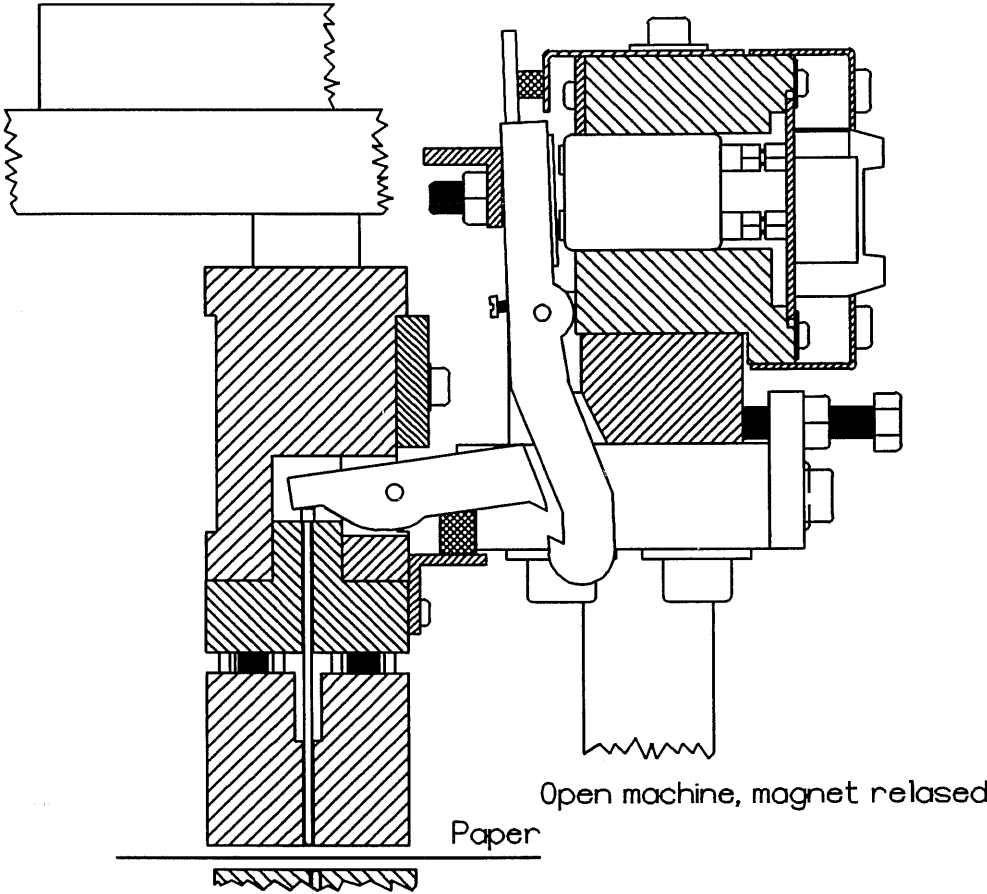


# Magnet Rack, Figures





3.7 Magnet Rack, Printing Process



### 3.8 How to replace Short Pivot Arms

See figures on page 47.

If for some reason the short pivot arms need replacement, (worn or broken) this is the procedure to follow:

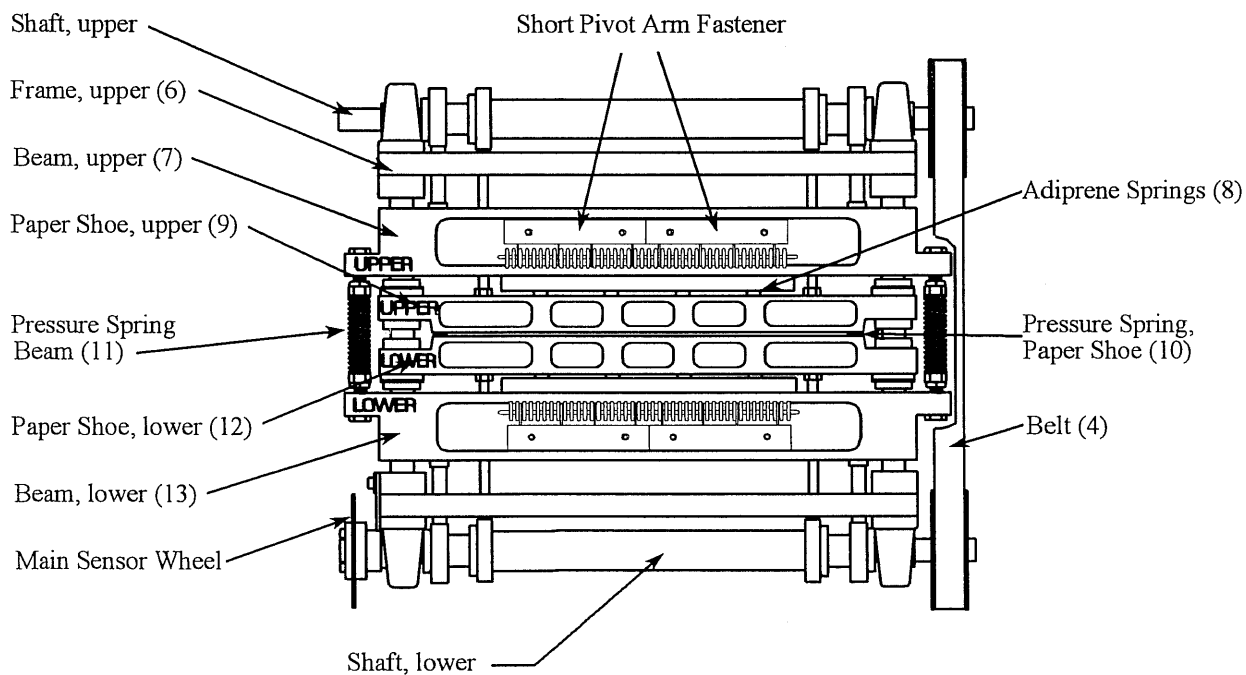
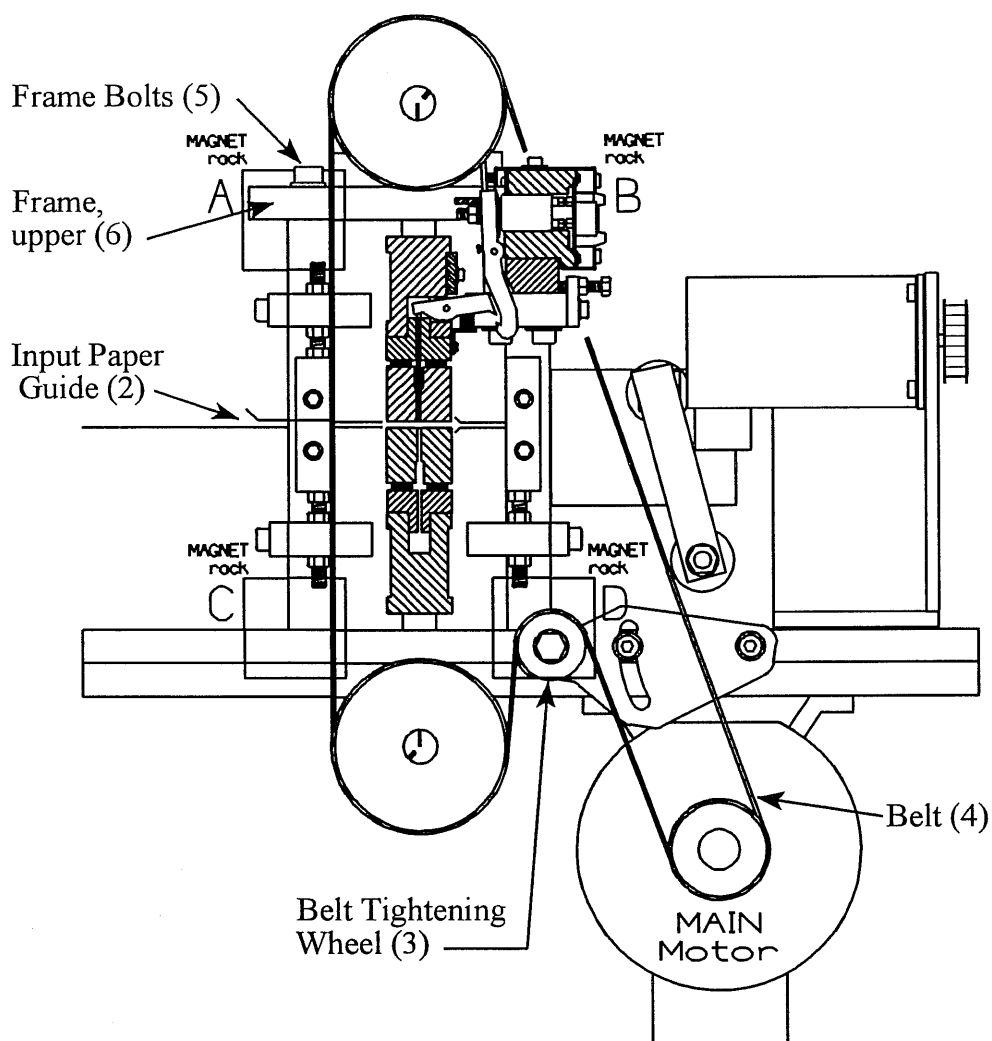
If the short pivot arm is situated on the upper unit, the replacement can be done quite easily.

1. Remove the magnet rack (the one in front of the defect short pivot arms) as described on page 41.
2. Take off the short pivot arm fastener (1). Pull the short pivot arms straight out of its slot, and the shaft will come out as well. The short pivot arms shaft consists of two parts, each containing 21 short pivot arms.
3. Put the new short pivot arms back in place, be sure to have the shafts all the way into its slot.
4. Fasten the magnet rack back on place.

If the defect short pivot arm is situated on the lower unit, it takes some more effort to replace it. This is due to the fact that the printing pin will fall down if the lower short pivot arms are taken out, and then you cannot get the new short pivot arm back in place.

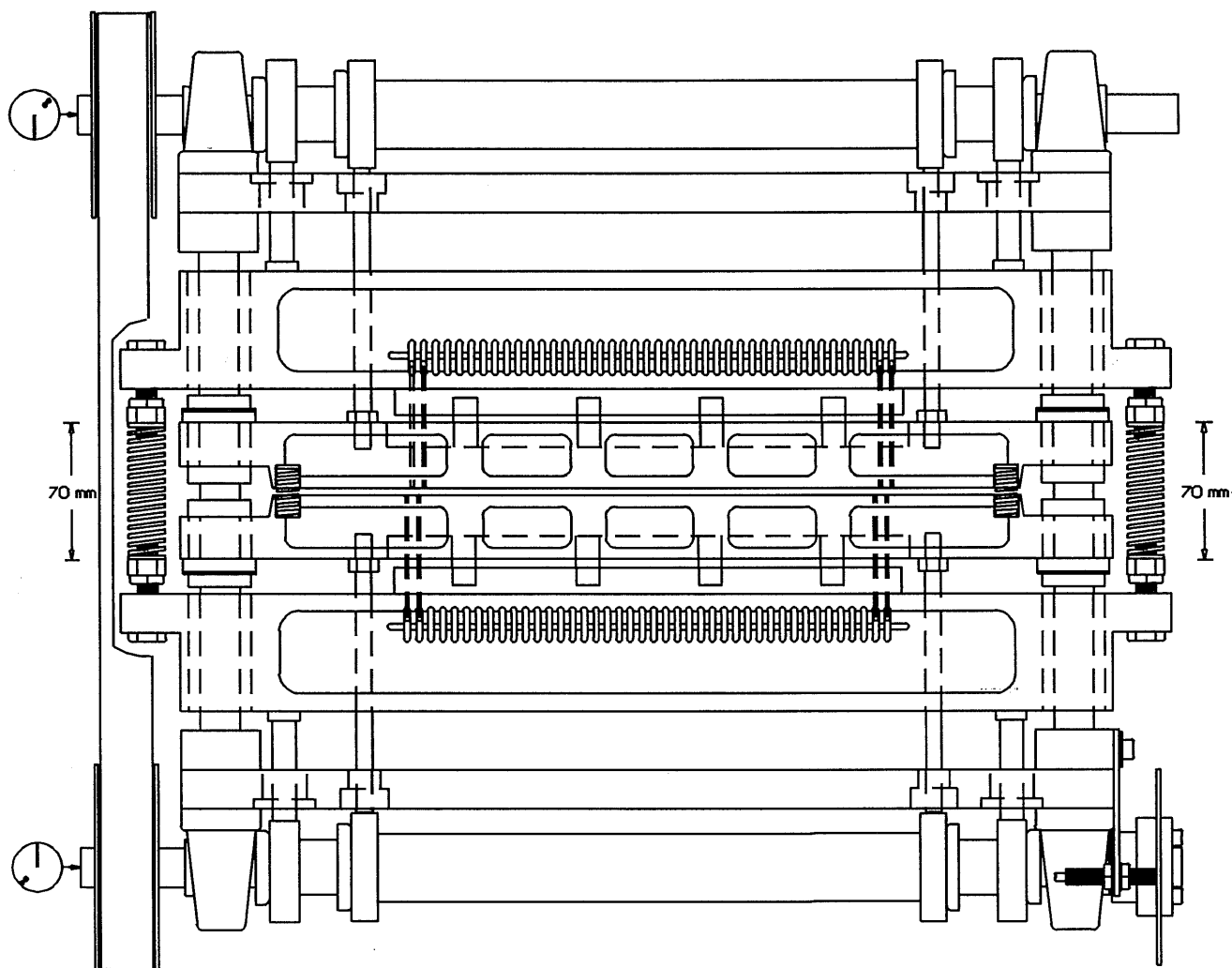
The procedure here is to take the beam with the short pivot arms out of the Printer before replacing the short pivot arm. Do as follows:

1. Remove the two upper magnet racks (A and B).
2. Move the paper cutter out from the Printer (Loosen four bolts). Note the electrical cables. Do not take the paper cutter completely out, just move it enough to be able to get the paper feed mechanism out.
3. Loosen the two bolts that are fixing the paper feed mechanism (placed on the pillars), lift the unit up and pull out. Leave the unit on the printer's frame without disconnecting the cables.
4. Take off the input paper guide (2).
5. Loosen the belt tightening wheel (3), and remove the belt (4).
6. Loosen the four big bolts (5) on top of the frame (6). Take this bolts all the way out.
7. Now the top part of the frame with the upper shaft must be lifted upwards and placed aside. Note that the top part of the frame is precisely aligned with the two columns, and could be a little tricky to lift upwards. The best way is to pull it all the way in one "snap". If this cannot be done, it should be wriggled carefully upwards, one side at the time, repeatedly until the unit can be lifted off.
8. Then, lift the upper beam (7) carefully upwards and place aside. Note that the adiprene pressure springs (8) are now loose and may fall out. There are eight adiprene springs on the upper unit. Also take care if there are some steel shims under the adiprene springs, they can easily fall out and disappear.
9. Lift out the upper paper shoe (9), take out the two blue pressure springs (10), and the two green pressure springs (11).
10. Lift out the lower paper shoe (12), again take care of the adiprene springs, and eventually the steel shims.
11. Lift the lower beam (13) out, and the short pivot arm can be replaced like described for the upper unit above.
12. Assemble in reverse order. To be able to get the belt on correct, see chapter 3.10 "Eccentrics, Adjustment".



### 3.9 Return Springs, Adjustment

The adjustment has to be done when the shafts are in this position. (See the marks at the end of the shafts on the figure below.)

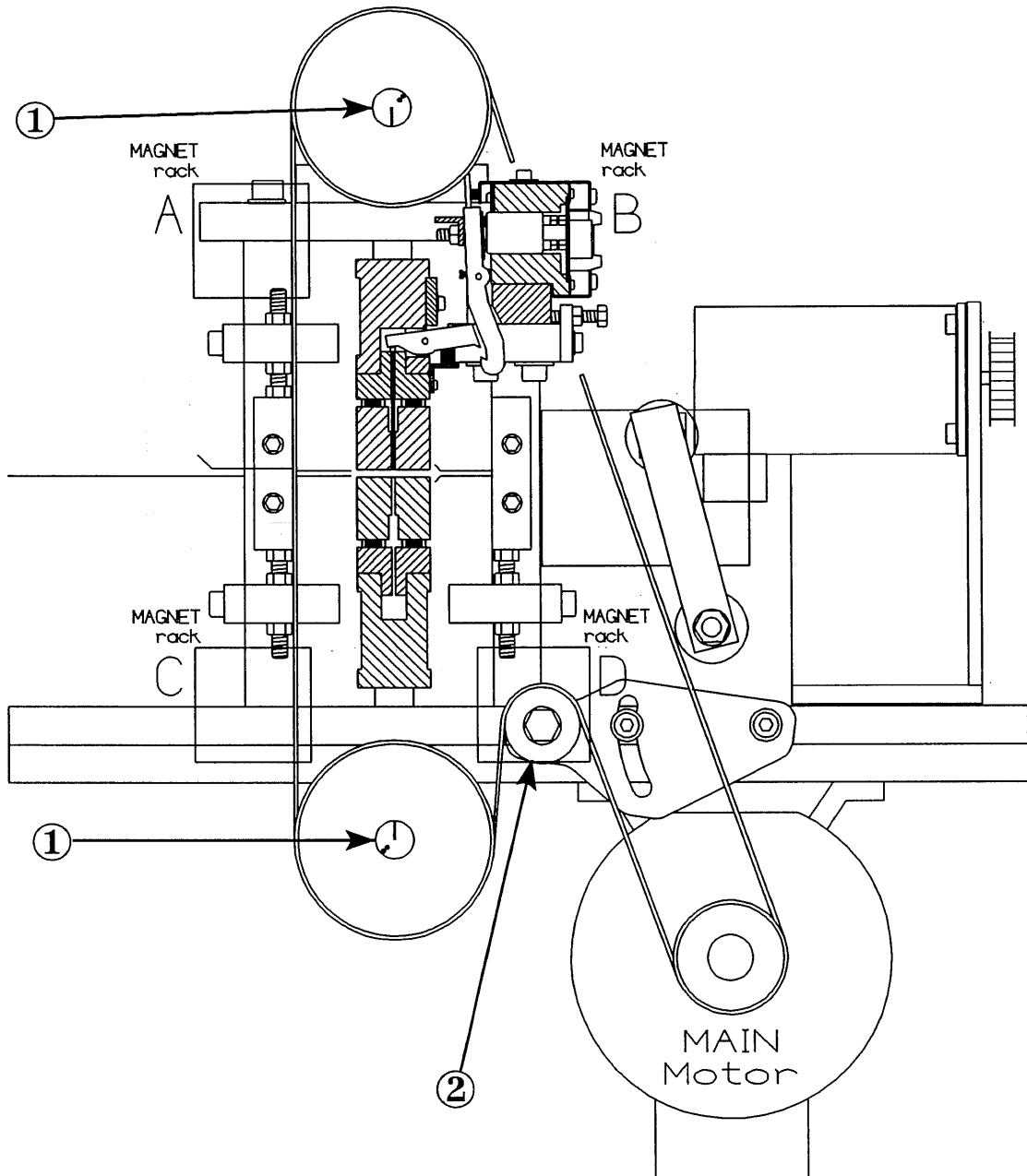


### 3.10 Eccentrics, Adjustment

After taking off the belt, it is necessary to align the eccentrics.

Put the belt back on, tighten it with the belt tightening wheel (2), and check that the marks at the end of the shafts (1) are pointing towards each other. (See figure below).

If the marks are not aligned like on the figure, it may be necessary to move the belt a notch or two on one of the wheels.



### 3.11 Paper Shoes, Adjustment

Place a sheet of paper between the paper shoes (P).

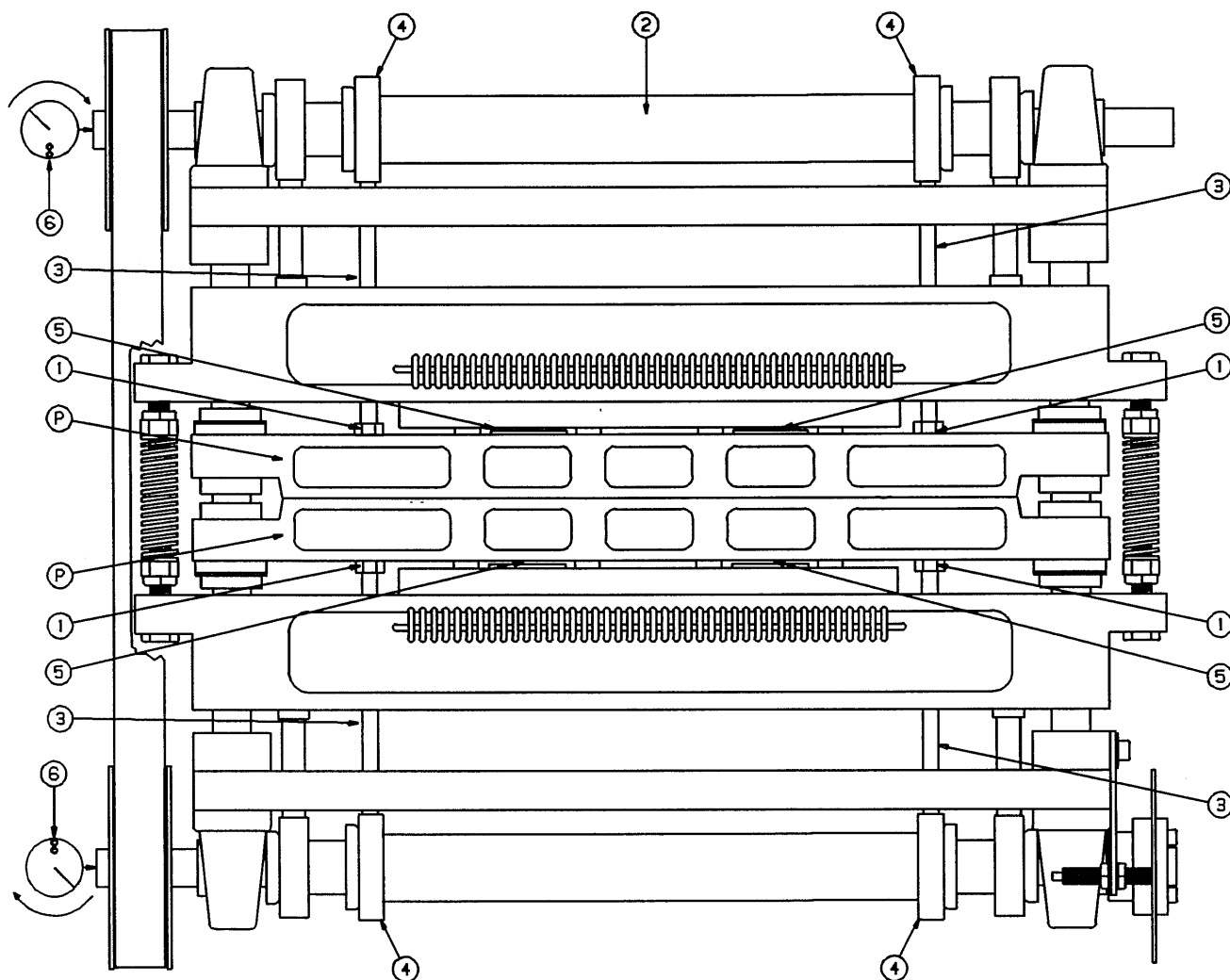
Turn the belt so the two points (6) at the end of the shafts (2) is pointing towards each other as shown on the figure below.

Lock the shafts in this position with a wrench, e.g. at the end of the shaft (2).

Loosen the locking nuts (1), adjust the push rods (3) by turning them. Adjust it against the inner eccentric bearing (4) until the paper shoes (P) have a light press on the paper.

Check that the gap (5) between the press plates and the beam above, is equal on both upper and lower units.

Secure the push rods (3) with the locking nuts (1).

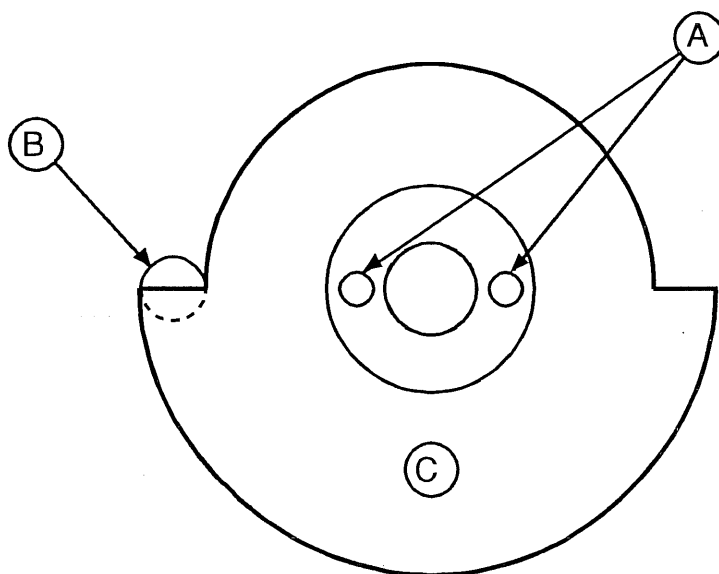


### 3.12 Main Sensor Wheel, Adjustment

The main sensor wheel is placed on the lower shaft under the white metal cover fastened on the frame. Remove this cover.

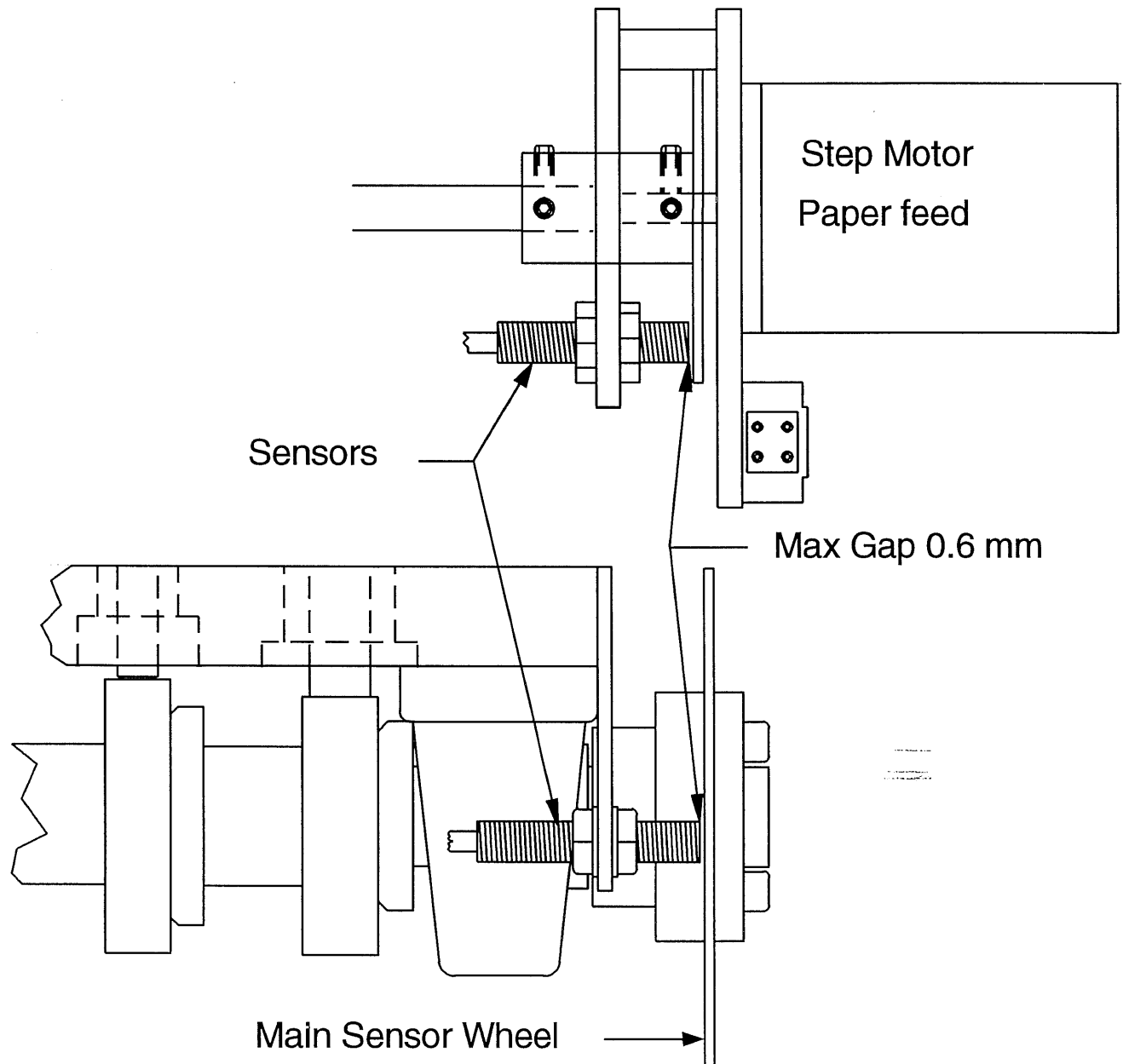
Turn the belt in the opposite direction of the printer's normal rotation until the paper shoes just meets (Do not press !). Keep the shafts in this position while loosening the screws (A). Turn the sensor wheel (C) until the edge on the wheel is placed in the middle of the inductive sensor (B). Fasten the screws (A) and put the cover back on.

(See figure below.)



### 3.13 Inductive Sensors, Replacing and Adjusting

When replacing the sensors, the gap between the sensor wheel and the sensors can be maximum 0.6 mm. See figure below:





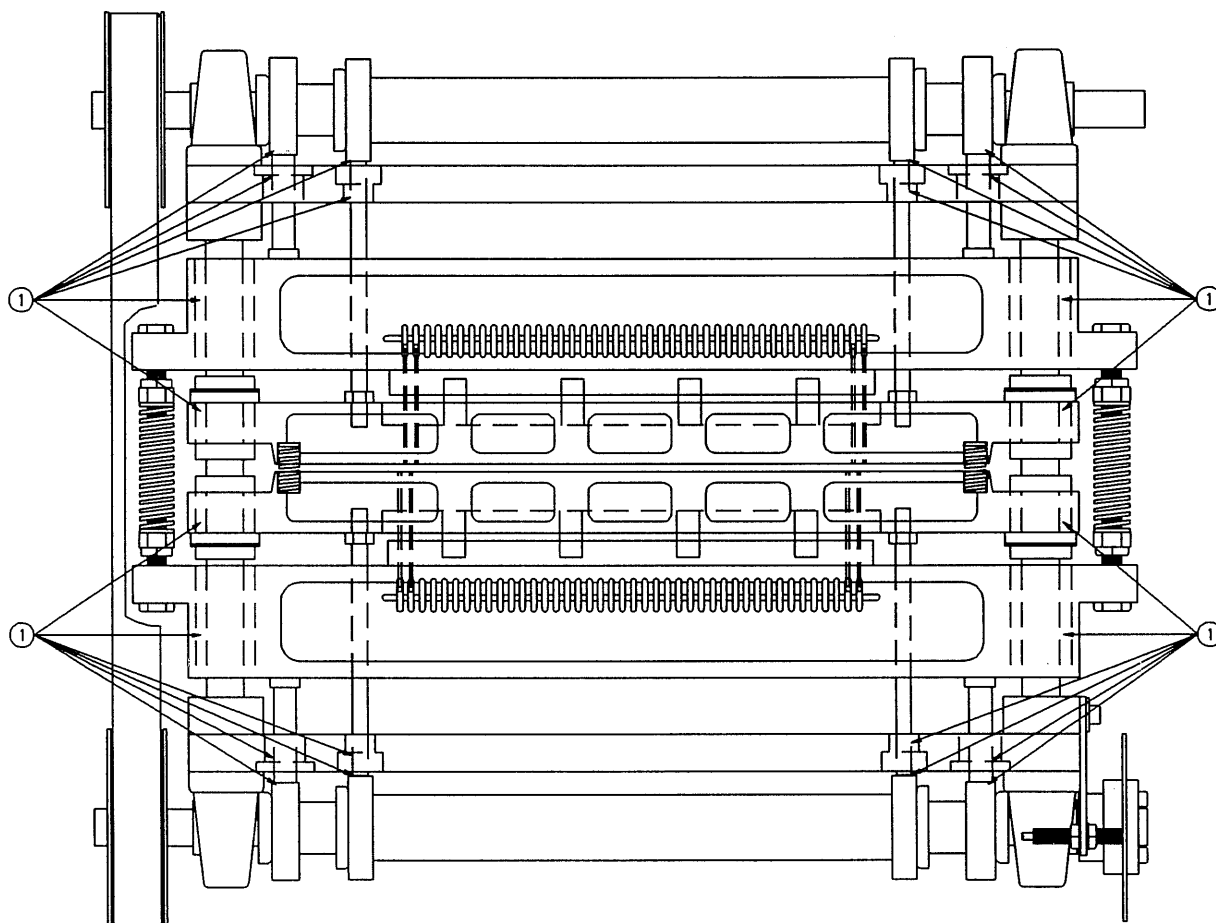
### 3.14 Maintenance

The printing of paper produces paper dust which stick to the mechanical parts of the printing mechanisms and to the paper guides. Depending on the paper type used, it is necessary to clean the Printer regularly with a vacuum cleaner, e.g. every 50.000 sheets.

Further, we recommend that at least once every year, the magnet racks are taken apart for more thoroughly cleaning. Disassembly the magnet racks as described on page 43, and the different parts should be wiped off with a cloth moisturized with alcohol. The most important areas: The surface on the piece of iron in the long pivot arm, the magnet poles, the surface on the long pivot arm which lay against the support list and the support list itself.

Lubrication of Printer.

Bearings (1): Lubricate (grease) after approx. 2000 hours, but: Lubricate if the Printer for some other reason is disassembled.

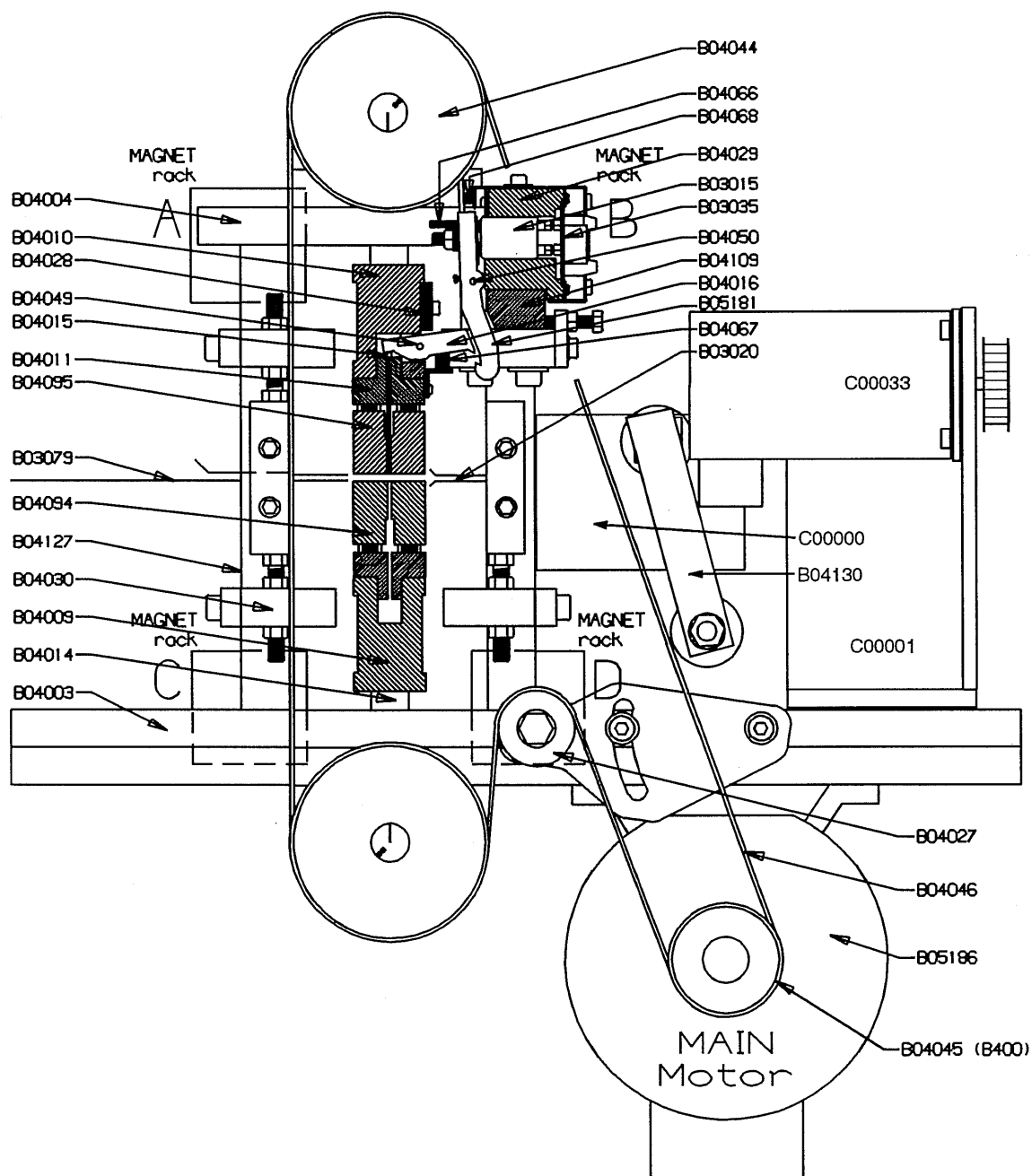


### 3.15 Spare Part List

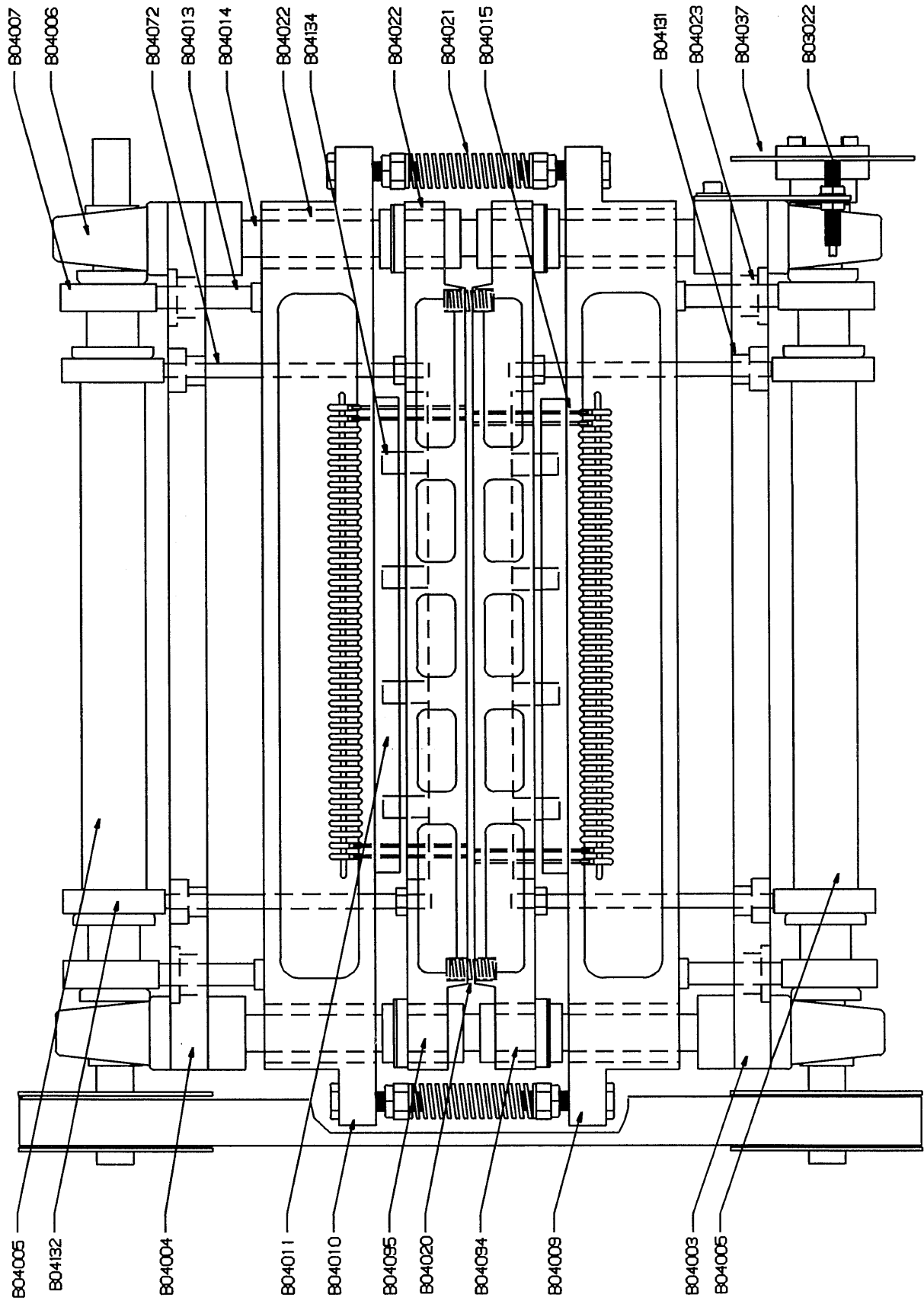
No.	Name	Number of parts
B03015	Magnets	168
B03020	Paper Guide, Inner	1
B03022	Inductive Sensor	3
B03032	Fan, Cover	2
B03035	Magnet Rack Board	4
B03074	Motherboard	1
B03076	Operating Panel	1
B03079	Paper Guide In / Out	1
B03085	Sensor Wheel, Tractor Feed Assembly	1
B03088	Cable, Magnet Rack, flat set	1
B03089	Cable, Magnet Rack, round set	1
B03090	Mains Cable	1
B03091	Power Unit	1
B03111	Main Fuses	1
B03127	Relay, Alarm / Paper Cut	2
B04003	Frame, Lower	1
B04004	Frame, Upper	1
B04005	Shaft, Upper / Lower	2
B04006	Main Bearing with Housing	4
B04007	Bearing Eccentric, Outer	4
B04009	Beam, Lower	1
B04010	Beam, Upper	1
B04011	Rack, Printing Pins	2
B04013	Piston	4
B04014	Columns	2
B04015	Printing Pin	168
B04016	Pivot Arm, short	168
B04020	Pressure Spring	2
B04021	Return Spring	2
B04022	Stroke Ball Bearing, Paper Shoe	4
B04022	Stroke Ball Bearing, Beam	4
B04023	Stroke Ball Bearing, Piston	4
B04027	Belt Tightening Wheel	1
B04028	Short Pivot Arm Fastener	8
B04029	Magnet Rack	4
B04030	Fastener Magnet Rack	8
B04037	Main Sensor Wheel	1
B04044	Pulley, Shaft	2
B04045	Pulley, Motor	1
B04046	Belt	1
B04049	Shaft, Short Pivot Arm	8
B04050	Shaft, Long Pivot Arm, Magnet Rack	4
B04051	Vibration Absorbers	8
B04066	Support List, Pivot Arm, Magnet Rack	4

No.	Name	Number of parts
B04067	Sponge List, Short Pivot Arm	4
B04068	Sponge List, Magnet Rack	4
B04072	Push Rod, Paper Shoe	4
B04094	Paper Shoe, Lower	1
B04095	Paper Shoe, Upper	1
B04109	Guide List, Long Pivot Arm	4
B04121	Fuse, Motor (resetable)	1
B04127	Pillar	4
B04130	Belt Tightening Assembly	1
B04131	Stroke Ball Bearing, Rod, Paper Shoe	4
B04132	Bearing, Inner Eccentric	4
B04134	Pressure Spring, Adiprene	16
B05052	Contactor, Motor	1
B05055	Hour Counter	1
B05181	Pivot Arm, Long, Magnet Rack	168
B05186	Main Motor	1
C00000	Paper Feeder, complete	1
B02141	Stepping Motor, Paper Feed	1
P02181	CPU Power Supply	1
X02029	Fuse, Relays 1.25AF	1
X02548	Fuse, Magnet Rack 3.15AT	4
X02549	Fuse, Step Motor 2.50AF	1

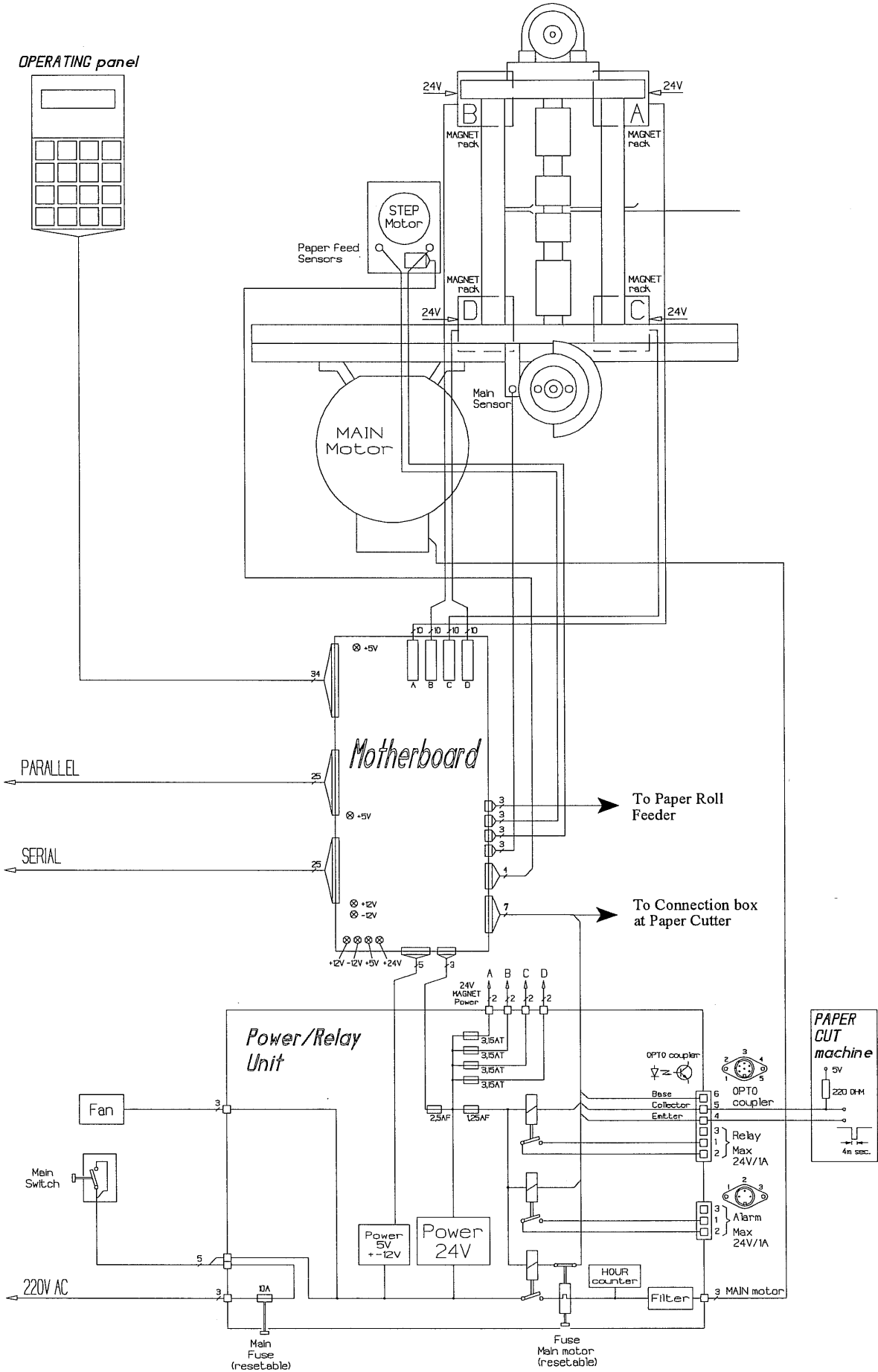
## 3.16 Overview Spare Parts, Side



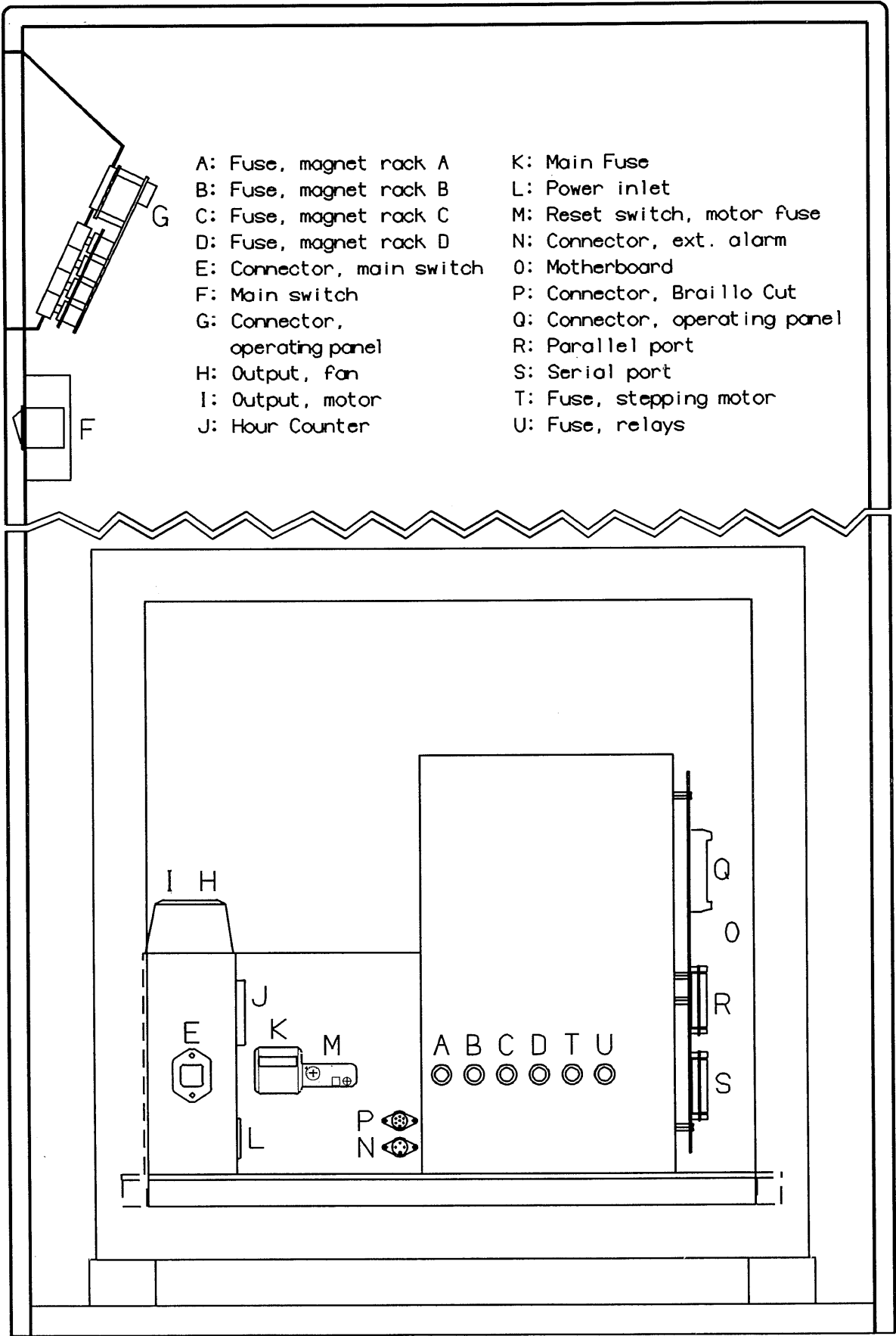
3.17 Overview Spare Parts, Front



3.18 Cable Connections, Fuses

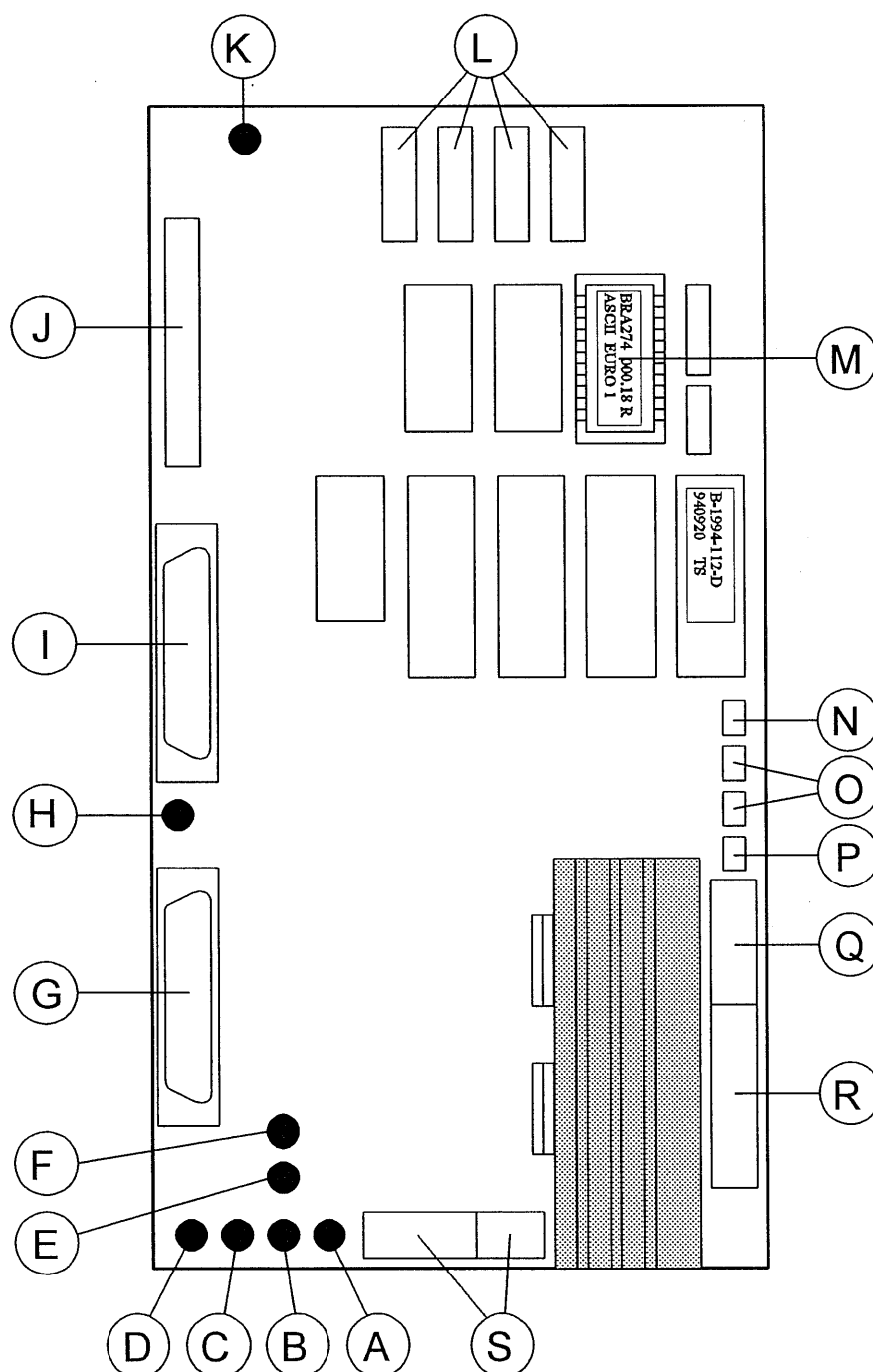


3.19 Electric Unit



### 3.20 Motherboard

- |    |                           |    |                               |
|----|---------------------------|----|-------------------------------|
| A: | LED, 24 V                 | K: | LED, 5 V Magnet racks         |
| B: | LED, 5 V                  | L: | Connectors, Magnet racks      |
| C: | LED, -12 V                | M: | EPROM socket                  |
| D: | LED, +12 V                | N: | Connector, Paper Out sensor   |
| E: | LED, -12 V Serial port    | O: | Connector, Paper Feed sensors |
| F: | LED, +12 V Serial port    | P: | Connector, Main sensor        |
| G: | Serial port               | Q: | Connector, Stepping Motor     |
| H: | LED, 5 V Parallel port    | R: | Connector, Relays             |
| I: | Parallel port             | S: | Power supply input            |
| J: | Connector, Operator Panel |    |                               |





### 3.21 Pin Configuration Serial and Parallel Port

Data transmission from the computer to the Printer can be done in two ways, either serial or parallel. The serial goes through an RS 232 C interface, and the parallel is using a Centronics compatible interface. Both connectors are of the 25 pin D-sub type.

#### Pin configuration 25 pin male D-sub contact RS 232 C (serial port):

Pin no. 1	FG	Frame Ground	
Pin no. 2	Tx	Transmit data	Output
Pin no. 3	Rx	Receive data	Input
Pin no. 4	RTS	Request to send	Output
Pin no. 5	CTS	Clear to send	Input
Pin no. 6	DSR	Data set ready	Input
Pin no. 7	GND	Signal Ground	
Pin no. 8	DCD	Data carrier detect	Input
Pin no. 9	PU	+ 12V (Logic high)	Output
Pin no. 20	DTR	Data terminal ready	Output

The Printer is only using pin no. 4 (RTS) as a control signal. When this is set to logic low (from the Printer), the computer must stop sending text immediately. Pin no. 2 (Tx) is used to transmit XON/XOFF control signals to the computer. The text sent to the Printer is received through pin no. 3 (Rx). All other outputs from the Printer are set to logic high.

#### Pin configuration 25 pin female D-sub contact (parallel port):

Pin no. 1	Strobe	Input	Active low
Pin no. 2	Data 0	Input	
Pin no. 3	Data 1	Input	
Pin no. 4	Data 2	Input	
Pin no. 5	Data 3	Input	
Pin no. 6	Data 4	Input	
Pin no. 7	Data 5	Input	
Pin no. 8	Data 6	Input	
Pin no. 9	Data 7	Input	
Pin no. 10	Acknowledge	Output	Active low
Pin no. 11	Busy	Output	
Pin no. 12	Paper out	Output	
Pin no. 13	Select	Output	
Pin no. 14	Not in use		
Pin no. 15	Select		
Pin no. 16	Not in use		
Pin no. 17	Frame Ground		
Pin no. 18	Signal Ground		
Pin no. 19	Signal Ground		
Pin no. 20	Signal Ground		
Pin no. 21	Signal Ground		
Pin no. 22	Signal Ground		
Pin no. 23	Signal Ground		
Pin no. 24	Signal Ground		
Pin no. 25	Signal Ground		

## Wiring diagram for the enclosed serial cable

Standard RS 232 C cable, 25 pins to 25 pins:

25 pin female		25 pin female	
1	FG	FG	1
2	TD	RD	3
3	RD	TD	2
4	RTS	CTS, DSR	5,6
5,6	CTS, DSR	RTS	4
7	SG	SG	7
8	DCD	DTR	20
20	DTR	DCD	8

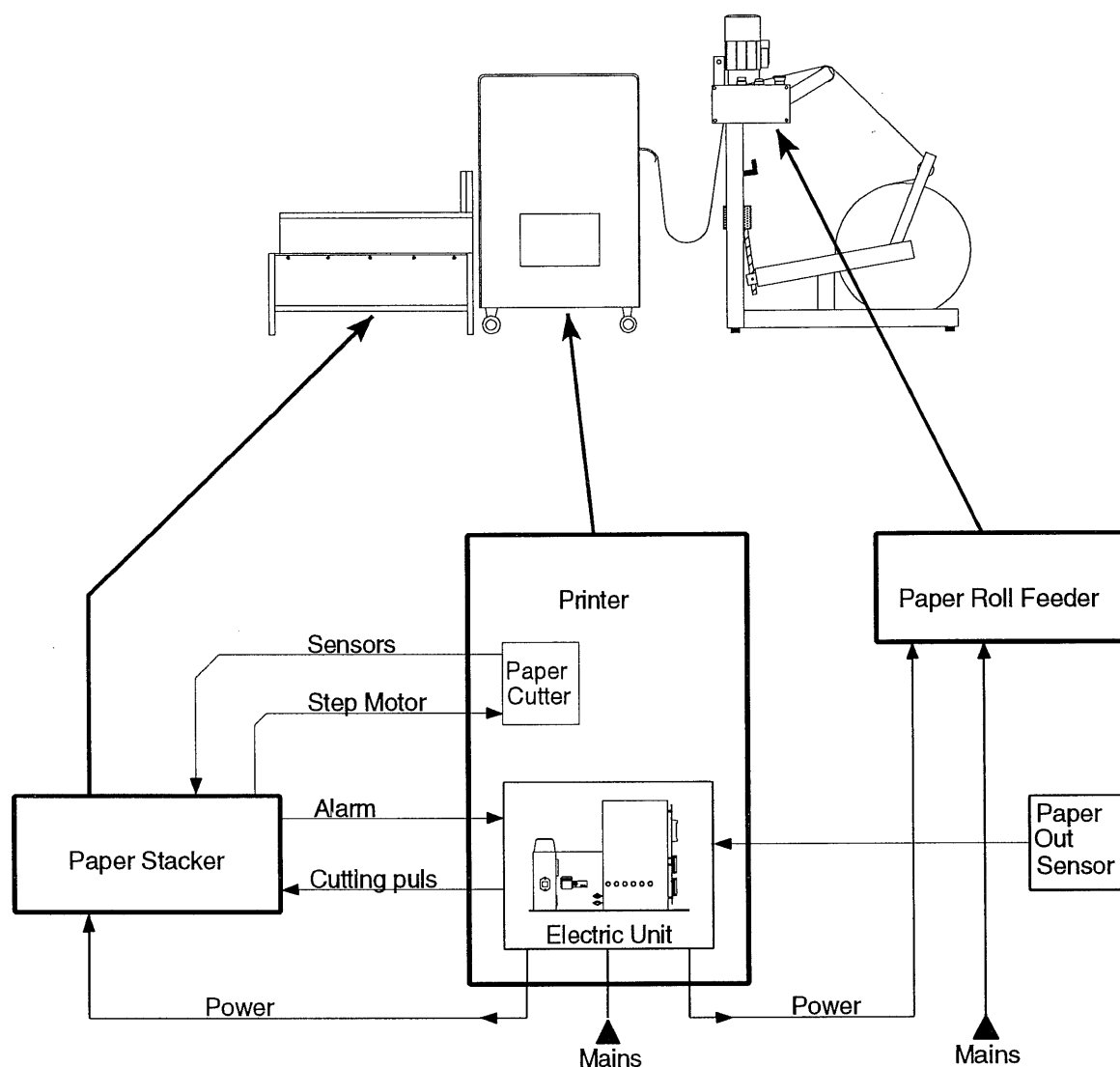
Wiring diagram for the serial cable with 9 pins adaptor:

Standard RS 232 C cable, 9 pins to 25 pins

9 pin female		25 pin female	
1	DCD	DTR	20
2	RD	TD	2
3	TD	RD	3
4	DTR	DCD	8
5	SG	SG	7
6,8	CTS, DSR	RTS	4
7	RTS	CTS, DSR	5,6

## 4. SERVICE AND MAINTENANCE PAPER CUTTER

### 4.1 Troubleshooting Paper Cutter



To be able to get to the paper cutter, the transparent cover must first be removed. This is done by sliding the cover about one centimetre to the left. This will release the cover from the fastening screws, and the cover can be lifted up and away.

The paper cutter is physically placed inside the Printer, but is controlled from the Paper Stacker, and is electrically to be considered as a part of the Paper Stacker.

If everything is OK upon power on, the paper cutter carriage will make a small movement back and forth and then park on one of the sides, and at the same time lift the paper pressbar.

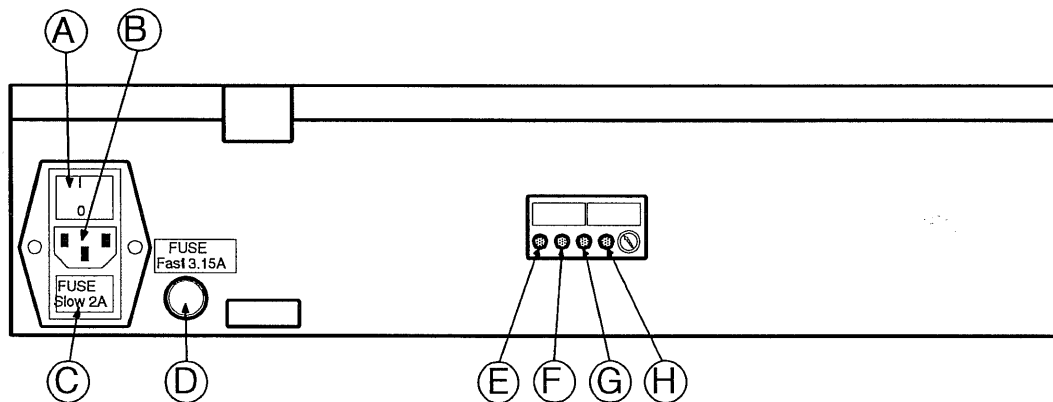
When it approaches the parking position on one of the sides, the sensor will detect the carriage, and the motor will stop. The step motor will keep the pressbar lifted due to its holding torque.

However, if the carriage for some reason does not reach the sensor, the following message will appear on the display in the Printer:

Cut/Stack Error  
At Paper Cutter

The reason might be:

1. The carriage is obstructed and cannot move.  
If it is suspected that the carriage cannot move easily, it can be tested like this: Turn the power off and remove the transparent cover. Move the carriage back and forth by hand. By doing this, it is possible to feel if the carriage is obstructed. Also try to move the carriage back and forth to both ends to see if the pressbar can be lifted. It is normal that it will be a little heavy to lift the pressbar. If there is some clogging on the travel across, try to locate where the carriage is stuck. Make sure the paper sliding plates and the paper guides are not obstructing the carriage. If the carriage can move quite easy, the problem is probably in the electrical unit or the wires.
2. Blown fuse?  
As described above, the paper cutter is to be considered as a part of the Paper Stacker, and is controlled from the Stacker electronic unit. The fuses can be found inside the Paper Stacker. To check the fuses, take of the side plate, switch the power on with the main switch on the Printer and see if there is light in the LED's like on the figure below:

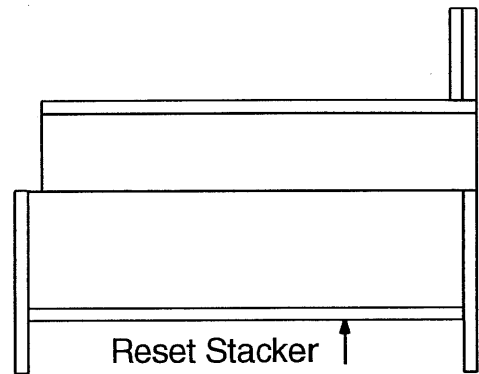


The LED's (E), (F), (G) and (H), must all be illuminated. If all is dark, make sure that switch (A) is turned on and the mains cable (B) is connected, then check the fuses under the cover (C). The cover (C) can be taken out e.g. with a little screwdriver. Observe that there are two fuses under the cover (C), and both must be OK to make the unit work. The fuses should be rated 2AT. If only LED (E) is dark, the fuse (D) is to be suspected. This fuse is taken out by unscrewing the cap, and the fuse is attached to this cap. This fuse is rated 3.15AF.

3. The belt is broken or damaged.  
Take the transparent cover off and make an inspection of the belt and the wheels. If the belt is broken or damaged, replace the belt.

## 4. System error.

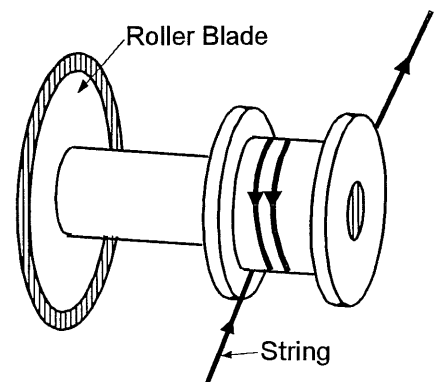
If the error message appears, and nothing of the above seems to be the case, there are several things that must be checked. However, this testing should be done by authorized personnel only. The problem may be caused by one of the following: The operating program is disturbed, (e.g. static noise), defect motherboard, defect wiring from the electric unit to the step motor, defect step motor, defect sensors, defect wiring to the sensors, defect power supply, etc. If something like this is suspected, try first to reset the Paper Stacker, if it does not help, contact authorized service personnel.



If the paper cutter carriage moves correctly, but still does not cut the paper properly, it could be caused by some of the following:

1. The string for the roller blade is defect, causing the roller blade not to rotate. Take the transparent cover off. Inspect the string. See "Overview of Spare parts" as a reference. If the string is defect, replace the string.

**Note!** When replacing the string, it must be mounted like the figure to make the blade rotate the correct way, and to give the carriage the correct tension against the fixed blade.



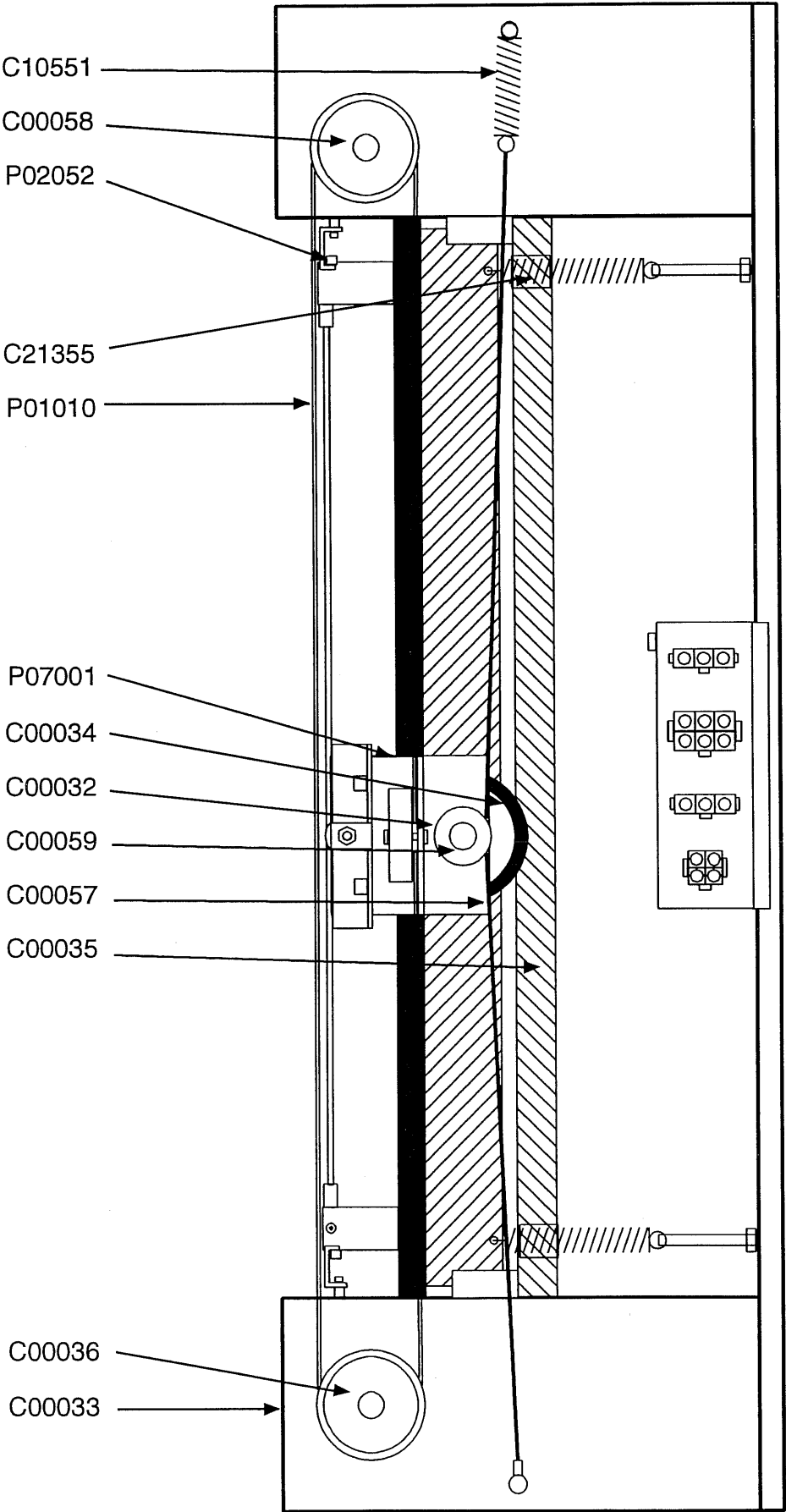
2. The cutting edge on the blades may not be sharp enough to give a clean, nice cut. To correct this, replace the roller blade, and if necessary the fixed blade.

**Note!** There is an exchange system for the fixed blade. This means that you can receive a new blade for a cheaper price if you return your old blade back to Braillo Norway.

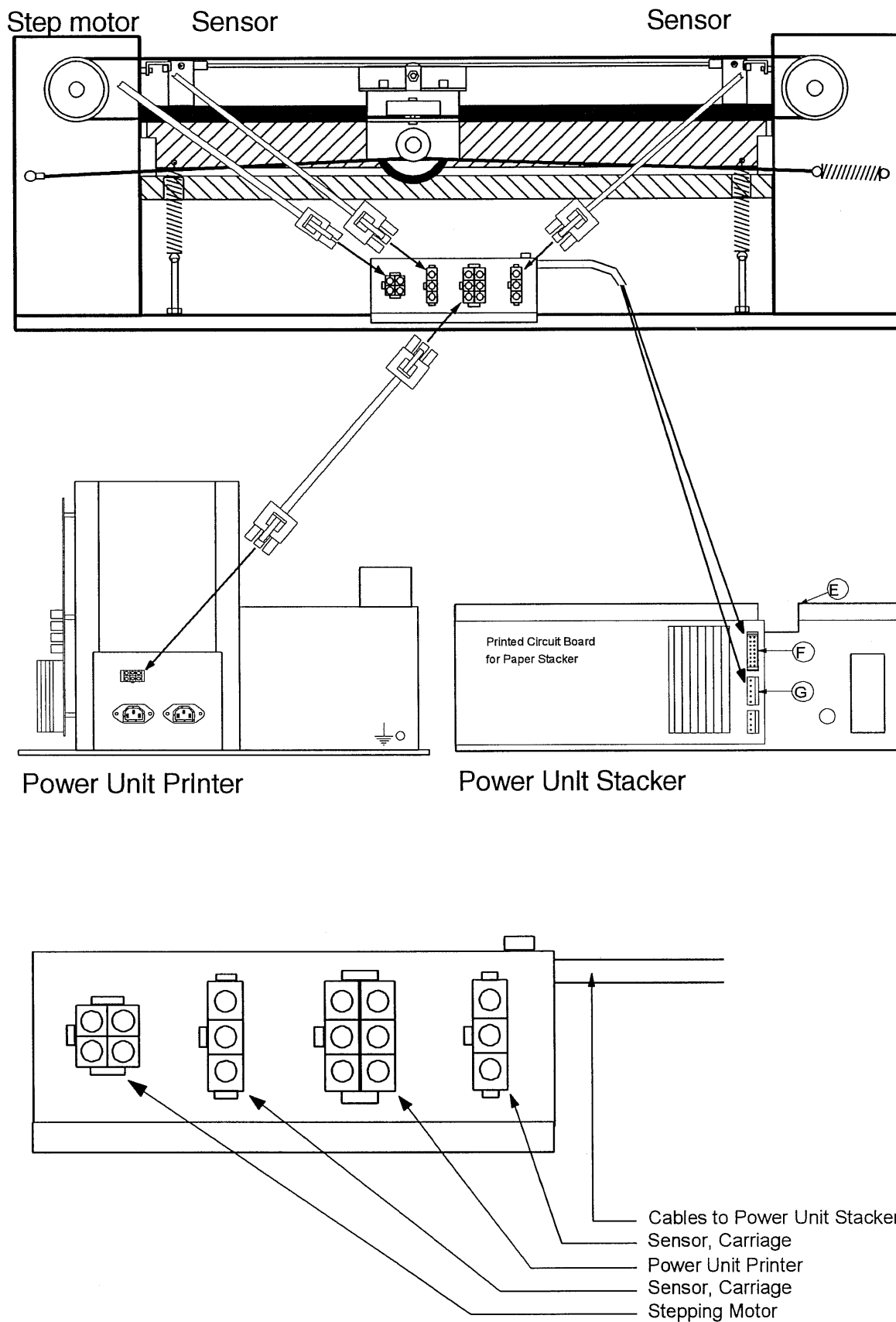
## 4.2 Spare Parts Paper Cutter

No.	Name	Number of parts
C00001	Paper Cutter, complete	1
C00032	Ball Bearing, Roller Blade	2
C00033	Step motor	1
C00034	Blade, Roller	1
C00035	Blade, Fixed	1
C00036	Wheel, Step motor	1
C00057	String	1
C00058	Wheel, belt	1
C00059	Wheel, String	1
C10551	Spring for String	1
C21355	Spring, Press Bar	2
P01010	Belt	1
P02052	Sensor	2
P07001	Stroke Ball Bearing, Carriage	2

4.3 Overview Spare Parts Paper Cutter



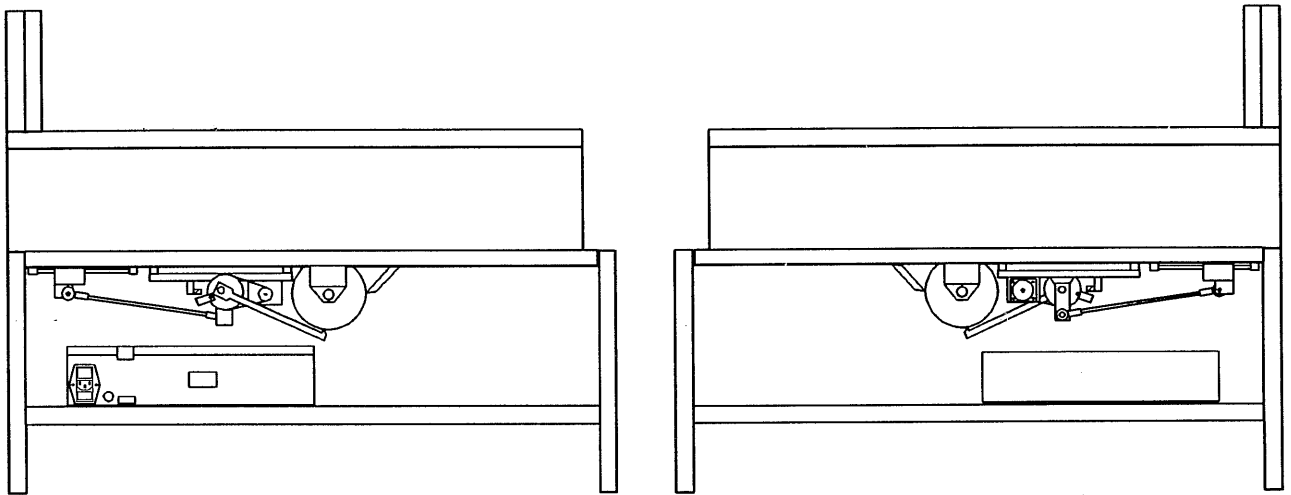
## 4.4 Cable Connections Paper Cutter





## 5. SERVICE AND MAINTENANCE PAPER STACKER

### 5.1 Troubleshooting Paper Stacker



#### Paper Mover.

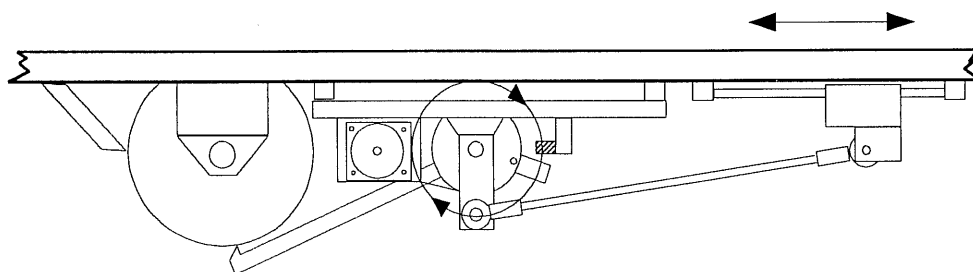
If everything is OK upon power on, the Paper Mover will move forward and backward and then park at the rear position.

If the Paper Mover cannot get to the parking position, the following message will appear on the display in the Printer:

Cut/Stack Error  
At Paper Mover

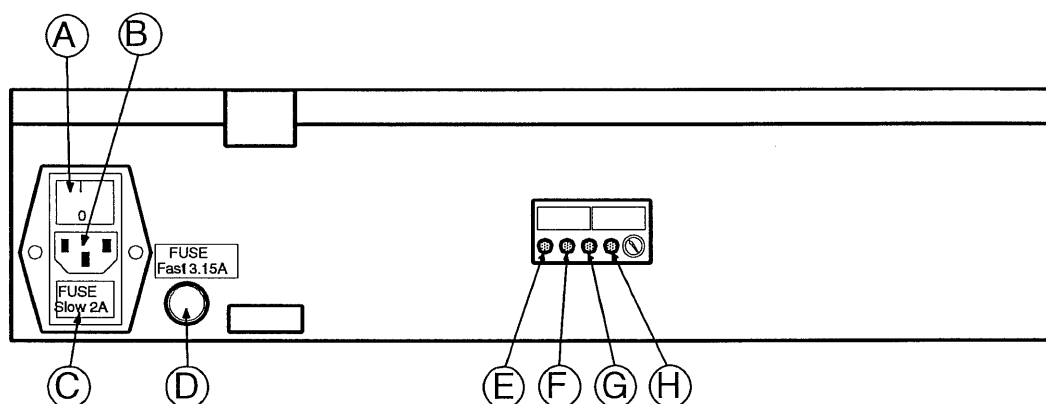
The reason might be:

1. The Paper Mover is obstructed and cannot move.  
Check if the Paper Stacker is adjusted to narrow for the moving plate, eventually replace the moving plate with a narrower plate. Check if the support plate has been pushed to close to the Paper Mover. If it is suspected that the mover cannot move easily, it can be tested like this: Take off the side plate. (See figure below). Turn off the power and turn the eccentric by hand. By doing this, it is possible to feel if there is something obstructing the movement. If there is some clogging, try to find the reason. If the eccentric can move quite easy, the problem is probably in the electrical unit or with the wires.



2. Blown fuse ?

The fuses can be found inside the Paper Stacker. To check the fuses, take of the side plate, switch the power on with the main switch on the Printer and see if there is light in the LED's like on the figure below:

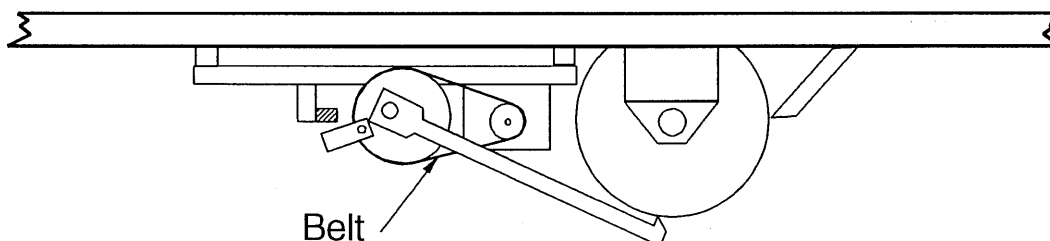


The LED's (E), (F), (G) and (H) must all be illuminated. If all is dark, make sure that switch (A) is turned on and the mains cable (B) is connected. Check the fuses under the cover (C). The cover (C) can be taken out with e.g. a little screwdriver. Observe that there are two fuses under the cover (C), and both must be OK to make the unit work. The fuses should be rated 2AT.

If only LED (E) is dark, the fuse (D) is to be suspected. This fuse is taken out by unscrewing the cap, and the fuse will be attached to this cap. This fuse is rated 3.15AF.

3. The belt is broken or damaged.

Take off the side plate and make an inspection of the belt and the wheels. If the belt is broken or damaged, replace the belt.



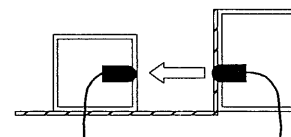
4. System error.

If the error message appears, and nothing of the above seems to be the case, there are several things that must be checked. However, this testing should be done by authorized personnel only. The problem may be caused by one of the following: The operating program is disturbed (e.g. static noise), defect motherboard, defect wiring from the electric unit to the step motor, defect step motor, defect sensor, defect wiring to the sensor, defect power supply, etc. If something like this is suspected, contact authorized service personnel.

## Paper Sensor

To detect if a sheet has fallen down from the cutter, there is a sensor in the Paper Stacker. (See the figure). Note that this is the top view.

The sensor consists of an infrared light transmitter and a receiver. The arrow is indicating the light beam. When a sheet falls down from the cutter correctly, it will block the light beam and be moved to the stack. After the cutter in the Printer has cut a sheet, the sheet must be detected by the sheet sensor within a certain period of time. If no sheet falls down within this period of time, it will activate the message "Cut/Stack Alarm At Paper Sensor".

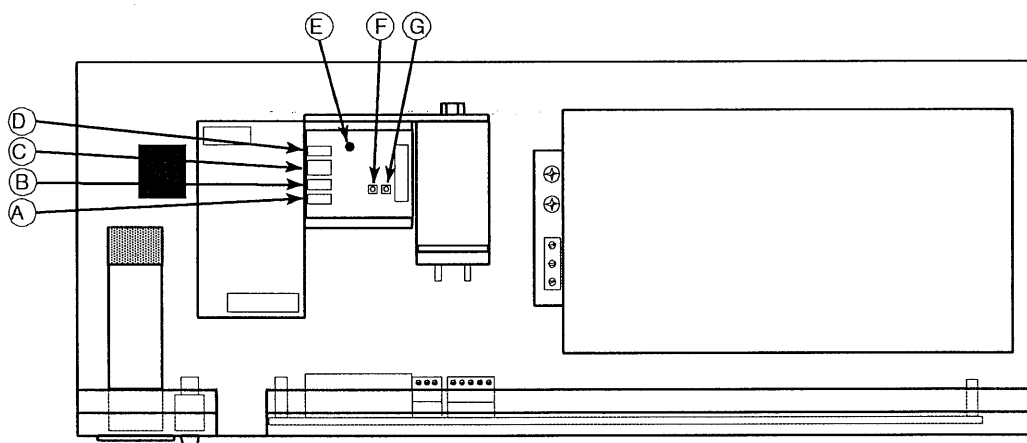


However, if the sheet falls down after this, or somebody "helps" it down, the Paper Mover will immediately move the sheet to the stack, and the message in the display changes to "Cut/Stack Ready". To continue the printing, push the TEST PRINT button in and out.

If the light beam is blocked any other time, the alarm message will also be activated.

**Note!** Observe that the Paper Mover may start to move when something is detected by the sensor. Use e.g. a piece of paper to block the light beam to avoid hurting your fingers.

If some problems are suspected with this sensor, it may be tested on LED (E) in the electronic unit. The LED will light up when something is detected by the sensor. (Something blocking the light beam).



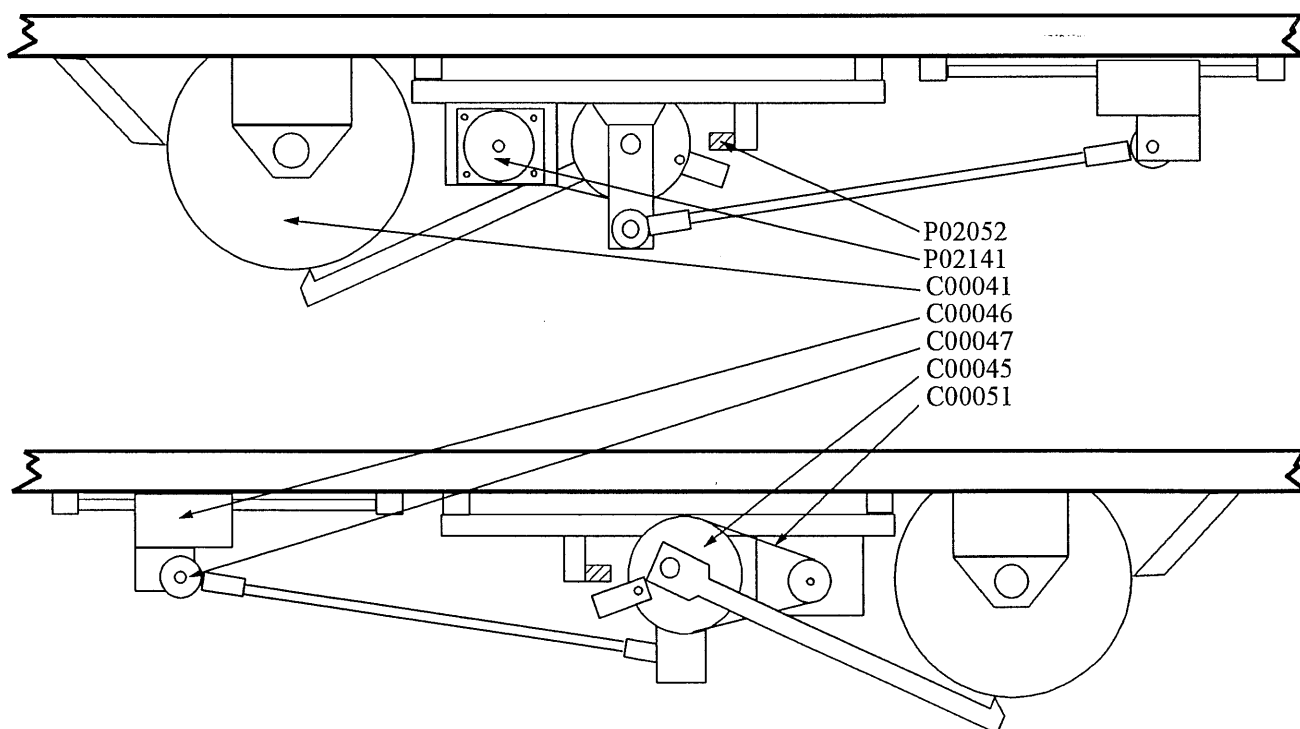
If the LED does not light up, check the connections (A) and (B).

The Paper Mover may be tested with button (G). When this button is pressed down, the Paper Mover will move forward and backwards and park at the parking position. The Paper Cutter will also make one cut. The complete Paper Stacker unit may be reset with button (F), or with the Reset switch underneath the unit.

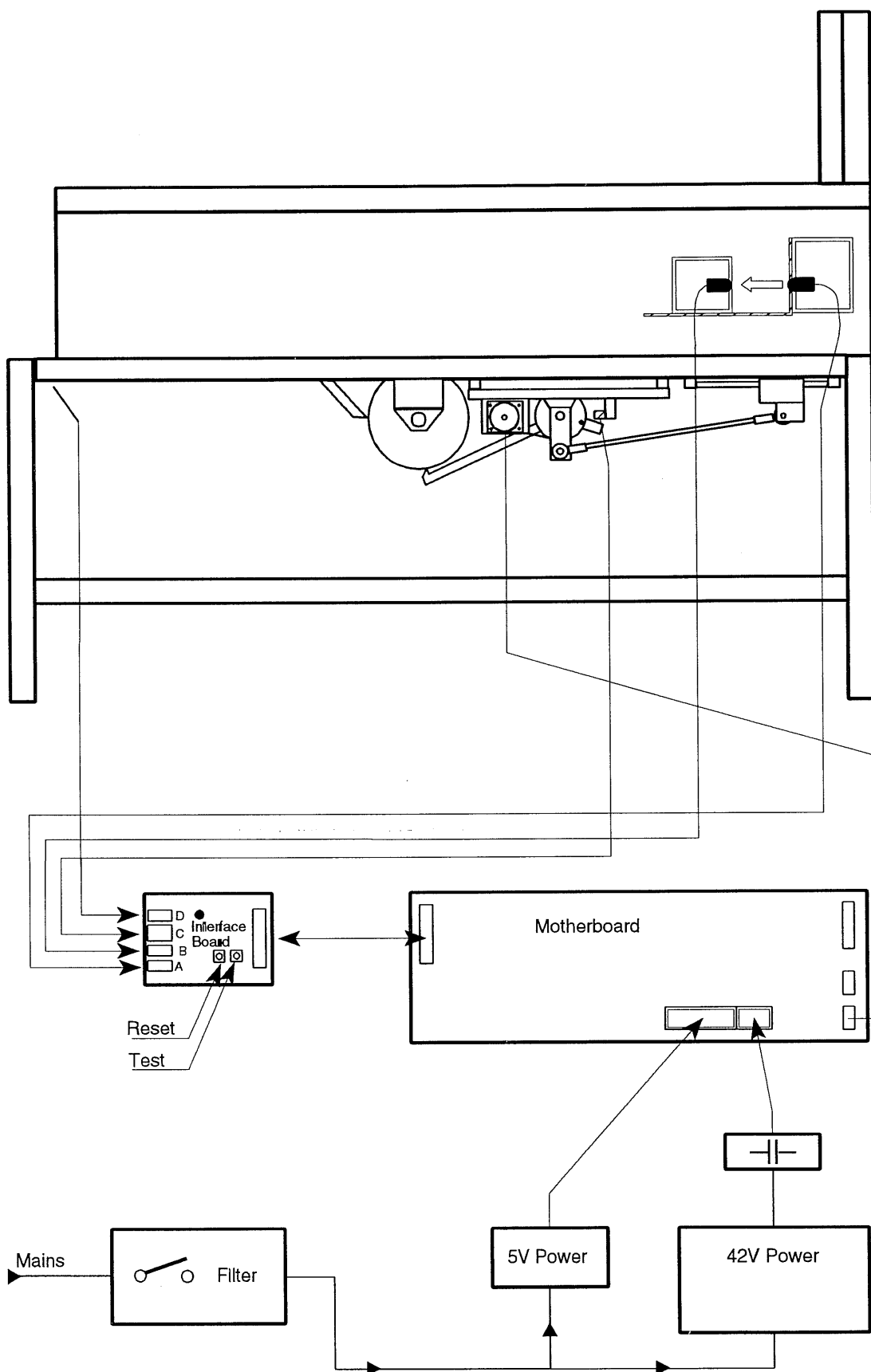
## 5.2 Spare Parts Paper Stacker

No.	Name	Number of parts
C00030	Microswitch	1
C00041	Cogwheel	1
C00045	Wheel, Belt	1
C00046	Housing, Stroke Ball Bearing	1
C00047	Joint Coupling	2
C00051	Belt	1
C07042	Electronic Unit Complete	1
C07044	Main Electronic Board	1
C00060	Interface Electronic Board	1
P02052	Sensor	1
P02141	Stepping Motor	1
P02165	Fan	1
P02181	5 V, +-12 V Power supply	1
P08001	42 V Power supply	1

## 5.3 Overview Spare Parts Paper Stacker



## 5.4 Cable Connections Paper Stacker



## **6. SERVICE AND MAINTENANCE PAPER ROLL FEEDER**

### **6.1 Troubleshooting Paper Roll Feeder**

The Paper Roll Feeder may be considered as an independent unit, even though it is switched on and off with the main switch on the Printer. There is also a connection between the "Out of paper" sensor and the Printer.

If the Paper Roll Feeder motor does not start, please check the following:

Is the red power lamp illuminated ?

If no; Is the main switch on the Printer turned on ?

Is the Paper Roll Feeder connected to the Printer ?

Are the mains cable to the Paper Roll Feeder connected to an outlet with power ?

Is the Emergency Switch pressed down ?

Is the handle stuck in a position which make the safety switch activated ?

If yes; Are the mains cable to the Paper Roll Feeder connected to an outlet with power ?

Is something covering the photo sensor ?

Are the Paper Roll Feeder and the Printer standing too close to each other, making the photo sensor detect the side of the Printer ?

### **6.2 Maintenance Paper Roll Feeder**

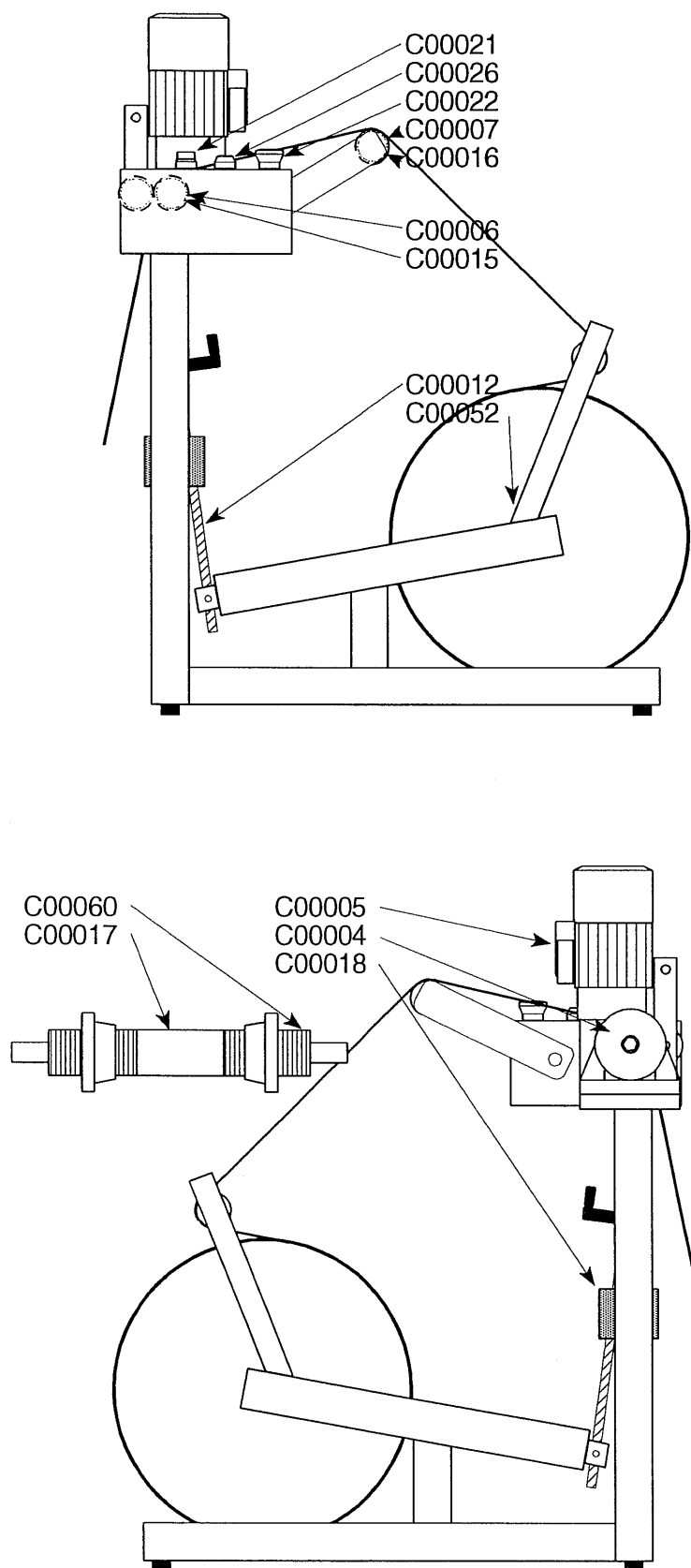
The Paper Roll Feeder will not need much maintenance. The bearings are of a sealed type and will not need any lubrication.

The most important thing is to ensure that the rolls are clean and undamaged. Keep especially an eye on the rubber roll. The rolls may be cleaned with a cloth moisturized with alcohol.

### 6.3 Spare Parts Paper Roll Feeder

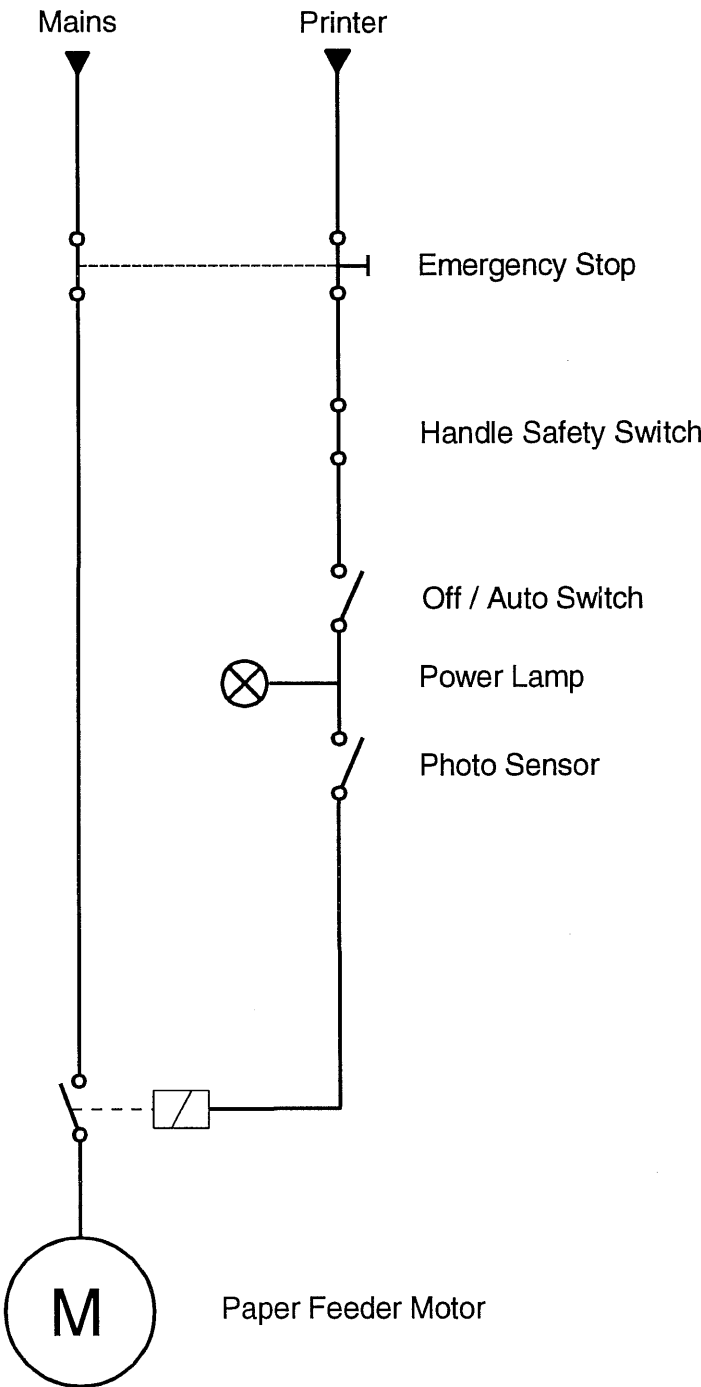
No.	Name	Number of parts
C00004	Worm Gear	1
C00005	Motor, Paper Feeder	1
C00006	Feeder Roll, Rubber	1
C00007	Correction Roll, Aluminium	3
C00012	Screw, Roll Lift	1
C00015	Roller Bearing, Feeder Roll	2
C00016	Roller Bearing, Correction Roll	6
C00017	Roller Shaft	1
C00018	Photo Sensor	1
C00021	Switch, "Off Auto"	1
C00022	Emergency Switch	1
C00026	Power Lamp	1
C00052	Switch, Out Of Paper	1
C00060	Roller Bearing, Roll Shaft	2

## 6.4 Overview Spare Parts Paper Roll Feeder





6.5 Electrical Connections Paper Roll Feeder



## 7. TECHNICAL SPECIFICATIONS

### 7.1 Technical Specifications

**Format:**

Chars per line: 10 - 42 chars.  
 Sheet length: 4 - 14 inches  
 Paper width: 210 - 330 mm  
 Page layout: Normal / Z-Fold  
 Page 1: Up / Down  
 Printing Type: Single / Double  
 Line Spacing: Adjustable, Single / Double  
 Dot: 6 / 8  
 Page Length: No Form Feed / Normal / Normal-1 to -9  
 Braille cell: Standard medium 6 or 8 dot.  
 Paper Weight: 120 - 180 g/m<sup>2</sup>, Recommended 150 g/m<sup>2</sup>

**Printing Speed:** 400 characters per second, Approx. 1200 printed pages per hour.

**Electrical:**

Voltage: Single phase 220V (+/- 10 %), 50Hz  
 Optional 220V (+/- 10 %), 60Hz  
 Current: Approx. 7 A max  
 Fuse Printer: 10 A  
 Power: Approx. 1500 W max

**Communication with the computer:**

Parallel on Centronics (25 pin D-sub female), or  
 Serial on RS 232 C (25 pin D-sub male).  
 Both are electrical isolated with opto-couplers to prevent noise and ground loops.

Parameters for the serial port:

Baud rate: 150 - 19200  
 Parity: No / Odd / Even  
 Data bit: 7 / 8  
 Stop bit: 1 / 2

**Environment:**

Temperatures: 15 - 30°C (60 - 86°F)  
 Rel. Humidity: 40 - 60%

**Measurements:**

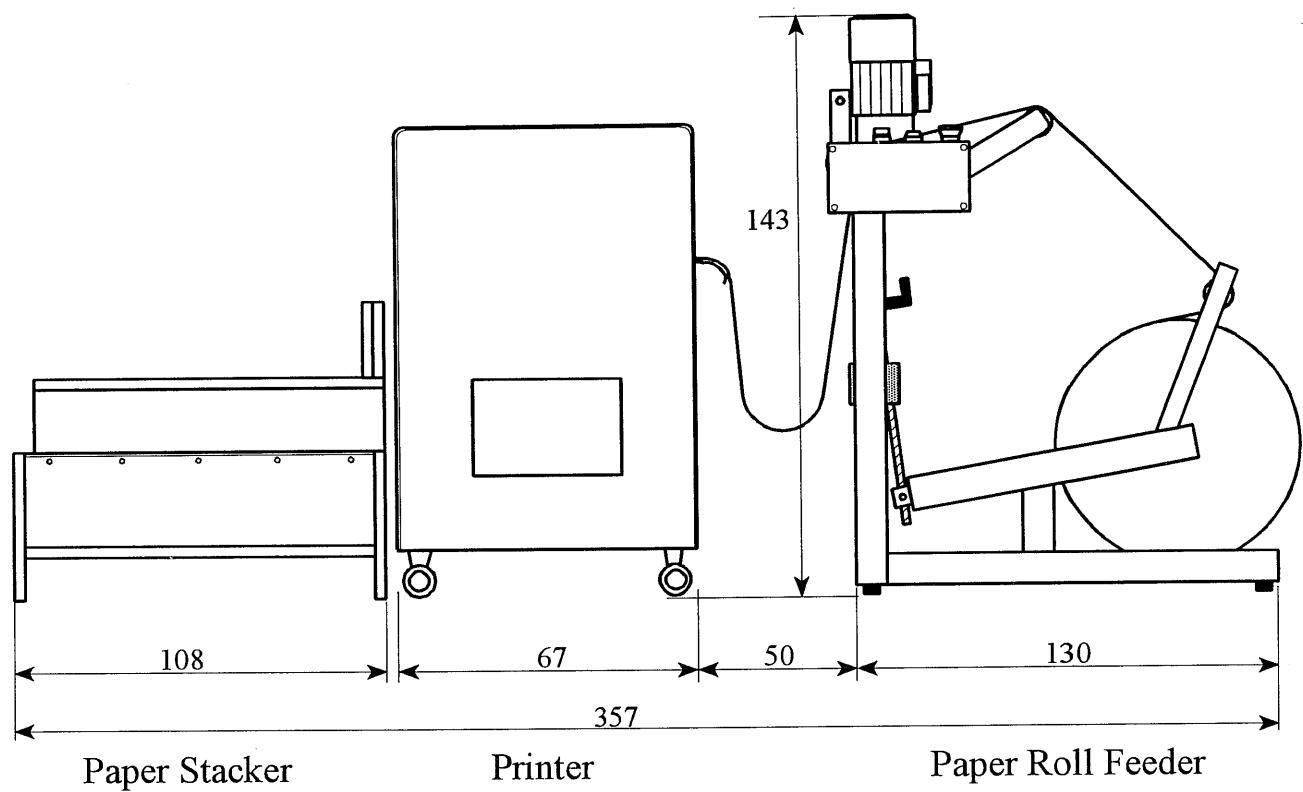
Height: 1430 mm  
 Width: 1040 mm  
 Length: 3570 mm  
 Weight: 301 kilos

**Patents:**

Norway	no. 140335
Great Britain	no. 2040231
USA	no. 4261663
Germany	no. DE 2850780 C22

7.2 Measurements

All measurements in centimetres.



Width: 104 cm

Weight:

Printer	203 kg
+ Paper Roll Feeder	70 kg
+ Stacker	28 kg
<hr/>	
= Total	301 kg

### 7.3 Adresses and Phone numbers

Administration Braillo Norway A.S:

Office: Storgaten 31  
Tønsberg  
Mail: POB 647  
3101 Tønsberg  
Norway  
Phone: +47 33 31 66 22  
Telefax: +47 33 31 66 77  
Telex: 70333 brail n  
E-mail: braillo@braillo.no

Production Braillo Norway A.S:

Office: Skolegata 1  
Stjørdal  
Mail: POB 93  
7501 Stjørdal  
Norway  
Phone: +47 74 82 49 29  
Telefax: +47 74 82 75 44

### 7.4 Recommended Spare part List

The following is a list of spare parts that Braillo Norway recommends the user of B 400 SR to keep in stock in case of urgent repair.

No.	Name	Number of parts
B03015	Magnets	10
B04016	Pivot Arm, short	10
B04046	Belt, main	1
B04067	Sponge List, Short Pivot Arm	4
B04068	Sponge List, Magnet Rack	4
B05181	Pivot Arm, Long, Magnet Rack	10
C00034	Blade, Roller	1
C00057	String, Paper Cutter	1
P01010	Belt, Paper Cutter	1
X02029	Fuse, Relays 1.25AF	1
X02548	Fuse, Magnet Rack 3.15AT	4
X02549	Fuse, Step Motor 2.50AF	1



